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FIG. 1. TYPICAL CASE OF ENDOTHELIAL DEPOSITS

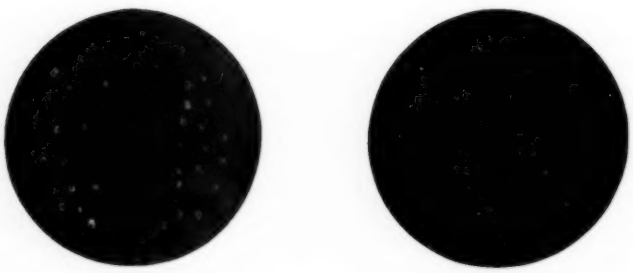

FIG. 2. ATYPICAL CASE OF ENDOTHELIAL DEPOSITS, SHOWING PIGMENT SPINDLE EPITHELIAL DYSTROPHY OF CORNEA (S. R. GIFFORD)

AMERICAN JOURNAL OF OPHTHALMOLOGY

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EPITHELIAL DYSTROPHY OF THE CORNEA AND ITS RELATION TO ENDOTHELIAL DYSTROPHY.

SANFORD R. GIFFORD, M.D.

OMAHA, NEBRASKA.

This is the report of three new cases of this condition with an account of reexamination of cases previously reported. It emphasizes the coincident occurrence of endothelial changes. It seems likely that both surfaces are affected by a common cause which may affect either one alone or both together. Two cases are also reported like those published by Graves, with dew like opacities scattered over the endothelial surface, which have escaped notice prior to slit lamp investigation. Plate 2 shows appearances in the first two cases.

In a recent article (Arch. of Oph. May 1925) several cases of this condition were described which showed early changes in the epithelium without any involvement of the deeper layers. Folds in Descemet's membrane were seen only in advanced cases (cases 3 and 4) and endothelial deposits only in Case 6, during an attack of iritis. These were not the endothelial deposits to be described, but much larger, opaque, pigmented precipitates.

I had read Graves' article[1] describing a group of cases with minute elevations of the endothelium, was watching for such pictures and had observed them occasionally, without changes in the epithelium. H. and J. Friedenwald in their very interesting slit lamp study of these changes, and their occurrence in typical cases of epithelial dystrophy suggested that the endothelial change is possibly the primary phenomenon[2]. I was unable to find these changes in the cases of epithelial dystrophy reported. Since that report, however, I have seen two cases which correspond closely to Fuchs' classical picture, and in these the endothelial elevations described by Graves and the Friedenwalds were unquestionably present.

Case 1. Mrs. M., aged 61, was referred to me by Dr. Nora M. Fairchild from the Nebraska Dispensary. The patient complained of poor vision and a "scratchy" feeling in the left eye for years, and of poor vision in the right eye for the past few months. Vision was R. E. 20/30, L. E. 6/200, unimproved. Tension was 12 Schiötz in each eye. To the naked eye, the left cornea showed a central aggregation of dense opacities while the right appeared normal. The slit lamp showed the epithelium of the left cornea to be edematous, with numerous blebs and vacuoles of various sizes present. The blebs were confined to the central area, and in the clearer cornea outside this could be seen a regular pattern of elevations on the posterior corneal surface. These were water-clear, round or oval, and of very uniform size, two to three times as large as the fine vacuoles seen in the edematous epithelium over them. They were best seen by retroillumination, in the area just outside of the sharply focused bundle. The elevations resembled fine droplets on the endothelium, but were absolutely stationary and probably represent, as Graves supposes, elevations of the endothelium, perhaps by some hyalin material formed by its cells. The right cornea showed a very similar condition of the endothelial surface. In the direct light the "dusted bronze" appearance was noted, but by retroillumination no definite pigment granules could be made out. The epithelium showed no blebs, but edema as evidenced by very fine vacuoles or droplets of fluid between or in the cells. The surface stained diffusely but faintly with fluorescein. No folds of Descemet's were seen in either eye.

Case 2. Mrs. A., aged 50, was scratched in the right eye by a finger

nail eight years ago and following this the sight failed without any pain or signs of inflammation. Four years ago the left eye began to fail. Tonsils and two infected teeth have been removed, and a thoro course of tuberculin injections given by her physician following a markedly positive diagnostic reaction. Vision is R. E. 3/200, L. E. 20/20-1 with correction. Wassermann and urinalysis are negative. (Following Whitham's suggestion that diabetes may be a factor in epithelial dystrophy, urinalysis was done in this and several of the previously reported cases, but none showed sugar.) Sensation was slightly diminished over both corneas and, as tested with a cotton point, was absent over some areas of the right cornea. Slit lamp examination of the right eye showed numerous large and small areas, all over the cornea, that stained with fluorescein. Numerous small blebs and a diffuse fine edema of the epithelium were present. The left cornea showed a few small blebs, and a fine edema of the cornea, which stained diffusely with fluorescein. Both corneas showed the same regular pattern of droplet like elevations of the posterior surface as was seen in Case 1. They were clear, without pigment granules, and of much the same size as those seen in that case. In the right cornea they could only be seen at the clearer edges of the superficial points; but in the left they occupied the central two-thirds of the cornea.

Both of these cases have been seen too short a time to describe their course, but, from their histories, the condition seems to be very chronic and slowly progressive, as in the typical cases described by Fuchs. Both were put on quinin internally and dionin.

Case 3. Another case was recently seen for the first time showing a fairly early stage of epithelial dystrophy with no endothelial changes. Mr. B., aged 48, had noted poor vision in the right eye for the past few months. Vision with best correction was R. E. 20/40+, L. E. 20/20—2. The ophthalmoscope showed numerous fine opacities in the anterior media of the right eye which proved on slit lamp examination to be all located in the corneal epithelium. This showed a fine edema, with numerous larger areas that stained sharply with fluorescein. These were of various sizes, some very slightly raised above the surface. In the left cornea, which showed nothing abnormal with the ophthalmoscope, the slit lamp revealed a similar fine edema with numerous smaller staining areas, but no definite blebs. In neither eye was the slightest sign of endothelial changes present nor were there any opacities in the stroma. The tension, as noted in several of the previous cases, was abnormally low, registering 7 mm. Schiötz in each eye. The patient left for his home in Wyoming using dionin and yellow ointment, with the advice to have numerous pathologic roots cared for. He was warned that the left eye might run a course similar to that in the right.

Thinking that the endothelial changes might have been overlooked in the previous cases, those who lived in Omaha were asked to report for examination. Case 5 of former paper, who had shown a mild but obstinate case, appeared in a somewhat improved condition. Vision was R. E. 20/20—2, L. E. 20/20. The epithelium of both eyes still showed numerous fine staining areas, and a fine edema. There were, however, absolutely no elevations of the endothelial surface to be seen by the highest magnification, nor any other changes in the deeper layers.

Case 4, who had had recurrent erosions of the left cornea with a mild condition of epithelial dystrophy of the left cornea, appeared about the same as at his last examination. His symptoms of irritation were somewhat improved and the congestion had cleared up considerably. Vision with correction was R. E. 20/20+, L. E. 20/100. The slit lamp examination showed the right cornea about the same as at the last examination, staining diffusely with fluorescein, with a number of areas which stained more sharply, but not definite blebs in the epithelium. The right eye showed a fine edema of the epithelium over the previously eroded area but no new blebs. No sign of any deposits on Descemet's

could be detected after careful search. The posterior reflecting zone of the cornea was well seen and showed no abnormalities.

In considering the question whether the endothelial or epithelial changes are primary, the Friedenwalds' case 3 is most interesting, as in it the endothelial elevations were first observed while the epithelium was normal, typical epithelial dystrophy developing in both eyes during four years' observation. In their other two cases the epithelial changes were fairly far advanced when they were first seen with the slit lamp. (One showed endothelial changes only in one cornea.) Graves mentions four cases which probably represent early epithelial dystrophy, as edema of the epithelium and blebs were present. All showed marked endothelial changes, and he considers that they represent the most advanced stage of the endothelial affection which he describes. There seems to be no doubt as the two cases just reported have illustrated to me, that both surfaces of the cornea are affected in the disease. My early cases, however, and the present case 3 showed definite epithelial changes with no visible elevations of the endothelium so that in these cases at least, the epithelial changes was primary.

It seems likely that both surfaces are affected by a common cause, perhaps a vasomotor disturbance causing edema or altered local metabolism, which may affect either surface alone, or both together. Some cause for both conditions must be assumed, since the elevations of the endothelium could not cause the epithelial dystrophy by their mere presence. It will be interesting to find out whether, in the course of years, Graves' early cases of endothelial affection will develop epithelial changes, and also whether the early epithelial dystrophies will show endothelial elevations.

It may be worth while to report two cases showing the changes described by Graves alone, as such cases have surely been frequently overlooked or diagnosed erroneously, previous to their recognition with the slit lamp and to his careful description. I had seen fairly frequently the vertical line of droplets on Descemet's membrane described by Vogt[3] as occurring after slight traumata or inflammations of the cornea, and which Lüssi[4] found in slight degrees in a majority of normal children. Of the conditions described by Graves, I have only seen one typical case and another, atypical in several respects.

The first, Mrs. P., aged 55, had worn glasses since childhood, but had been unable to read easily with any glasses for the past fifteen years. Vision with the best correction was R. E. 20/25, L. E. 20/30. Ophthalmoscopic examination by Dr. H. Gifford showed a faint opacity in the right cornea extending down and out from the center. No opacities were seen in the left cornea. The slit lamp showed the endothelium of both corneas to be covered with fine dew like deposits. These were densest in the central region but extended out almost to the limbus. (See Fig. 1.) In this distribution they resemble the three cases classified by Graves as Type III B. In direct light they appeared shiny and slightly brownish, but by retroillumination no pigment granules could be seen. The individual deposits resembled those seen in case 1 of the present report, almost exactly. Those on the right cornea were larger and more densely grouped, but it will be noted that vision was slightly better in this eye than in the left eye. Absolutely no irregularities were seen in the epithelium of either eye, nor any staining areas.

The second case was that of a woman of 31, referred by Dr. Chas. Way of Wahoo, Nebraska, on account of poor vision for the past two years. Best vision obtainable was R. E. 20/50, L. E. 20/25. With the ophthalmoscope a vertical line of dust like opacities was seen in the right cornea, and stellate cortical lens opacities. A slight vertical line of opacities was barely perceptible in the left cornea. With the slit lamp the corneal opacities were localized on the endothelial surface; and besides the vertical line, other dew like opacities were seen scattered over the greater part of the cornea, to within 2 mm. of the limbus. Those in the verti-

cal line were of various sizes, some fairly large and of a peculiar bronze color. They seemed flatter than those in the previous case and more irregular in size, while the peripheral deposits were clear and about equal in size, resembling those in Case 1. (See Fig. 2.) The vertical line of denser spots was ½ mm. wide but fading out into the surrounding sparser deposits. That in the left cornea was shorter, narrower, and with the deposits less closely packed, while the peripheral opacities were similar to those in the right cornea.

Neither eye showed any changes in the epithelium. The lens opacities were just beneath the capsule anteriorly, and posteriorly corresponded in general with the cortical suture lines. They were not water-fissures, but very delicate linear opacities. No lens opacities could be found in the left eye. Tension was 15 Schiötz in each eye. There were no signs of present or previous inflammation. When seen six months later, the condition was practically the same as at first. Vision was now R. E. 20/40+3, L. E. 20/20—3. In a general examination nothing could be found which seemed to have a bearing on the condition.

Atypical in this case are: 1. The age of the patient, 31. 2. The association with unusual lens opacities. In an older person, this could easily be considered a coincidence. Occurring in a woman of 31, however, and in the eye showing the more marked endothelial changes, some common cause is certainly suggested. The lens opacities were in no way like those of cataracta complicata, and the deposits quite different from inflammatory precipitates, so that the possibility of a chronic uveitis, at first considered, seems unlikely. 3. The arrangement of the corneal deposits in a dense vertical line, other deposits being present, however, outside of this. This arrangement suggests the dew drop formation previously mentioned as occurring after trauma or during slight inflammations. This line was originally described by Turk[5] and then by Erggelet[6], being considered by both as due to the deposit of cellular elements circulating in the aqueous, and as proving Turk's theory of the circulation of the aqueous due to warming from the iris and cooling from the cornea. While the location of the opacities is similar, the deposits differ from this "Bedewing" of the cornea in appearing flat, and in being pigmented. They resemble exactly the so-called "Krukenberg pigment spindle," while the clear deposits are the same as those described by Graves.

Vogt[7] has summarized twenty cases of this spindle formation reported up to 1921, including four of his own. It was observed by Krukenberg in 1899, by Stock, Hess, Weinkauff and Augstein, before the slit lamp, and by Kraupa and himself with the slit lamp. No case seems to have been reported from this country and Graves does not mention the condition. Of the twenty cases, all were bilateral but two, and nearly all were more or less myopic. Females were affected three times as often as males. The spindle is usually three to four mm. long and one to one-half mm. wide in the middle. It is always vertical, with the center of the spindle just below the center of the cornea. It is not associated with any inflammatory changes. Vogt discusses the relation of this condition to two other anomalies of the endothelial surface, senile pigmentation and the endothelial elevations later described by Graves, which he explained as probably especially close set Henle's warts of Descemet's membrane. The senile pigmentation, a scattering of fine pigment granules all over the posterior corneal surface, is quite common in persons over fifty, becoming more marked in the very old, so that it may interfere with vision. He found it fairly often associated with the endothelial elevations, which also were found chiefly in older persons. All the cases of pigment spindle were over thirty-five, and most considerably older.

In one of his cases a marked pigment spindle was associated with pigment dust all over the posterior surface, while in another the spindle merged with finer pigment granules on each side. He believes all stages exist between diffuse pigmentation and spin-

dle formation, and this, with the fact that a marked depigmentation of the iris existed in all the cases of spindle which he studied, leads him to classify it as senile or presenile change of the endothelium in the axial area causing the granules freed in this depigmentation process to adhere to it. He does not mention association of the spindle with the endothelial elevations, nor have I seen it described elsewhere.

Brandeis Bldg.

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CENTRAL RETINAL HEMORRHAGE, SYNCHRONOUS WITH ONSET OF MENSTRUAL PERIOD.

E. Nelson Neulen, M. D.,

ASTORIA, OREGON.

This hemorrhage occurred ten days after the eyes had been carefully examined for refraction. She was seen next day and the fundus sketched. A similar record of the appearance was made two years later. Meantime she had become subject to attacks of deep scleritis with development of corneal opacities in the other eye. The scleritis flared up at the menstrual period. Read before the Pacific Coast Oto-Ophthalmological Society, June, 1925.

The particular phase of this case to which I wish to call your attention, is the ophthalmoscopic findings observed during the first week following the sudden hemorrhage in the right eye, only ten days after the patient had been refracted, at which time, no pathology of the fundus was noted.

I have never seen a similar picture clinically, nor have I been able to find any reference to a like condition in my search of the literature. I allude to the six small nodules or tubercles seen three above and three below the borders of the hemorrhagic area, situated upon the inferior and superior branches respectively of the superior and inferior temporal arteries; the size of which, in their greatest diameter, equaled or exceeded the diameter of the vessel upon whose wall they seemed attached. Their further shape, size, and arrangement in relation to other structures of the eye, can best be learned by a study of the colored fundus drawing made on the second day of observation, Fig. 1, which also shows the relative size, shape and location of the large central retinal or preretinal hemorrhage.

A second colored fundus drawing, Fig. 2, was made about two and one-half years later and represents the present condition of the fundus. This shows how completely restitution had taken place and the absence of any pigmentation.

The involvement of the left eye with its attacks of episcleritis, scleritis and keratitis occurring after the onset of trouble in the right eye, helps to establish our diagnosis and to point more strongly to tuberculosis as the primary factor in causing this hemorrhage.

No attempt will be made to assign any cause for the failure of the hemorrhage recurring or reaction occurring in the right eye during the period that tuberculin was administered, when such violent "flare-ups" invariably manifested itself in the left eye.

Mrs. H. S., housewife, aged 29 years, mother of three healthy children, came to me first on December 20, 1922, complaining of blurring of print and slight headache after near work; also a slight redness of both eyes; no other symptoms. She had worn glasses for a short time, 6 years before, otherwise her history was negative. Vision in both eyes was better than 20/30, and she read with ease Jaeger type 1. Upon preliminary examination she accepted

a cylinder of plus 0.50 axis 90° in both eyes which gave normal vision. The pupils were normal in size, shape and reaction. The following day she underwent a homatropin refraction. Ophthalmoscopic examination failed to show any pathology whatever. Retinoscopy showed simple hyperopic astigmatism of 0.75 D. in the right eye and 0.50 D. in the left eye; this correction she accepted under the cycloplegic test and she was advised to wear glasses constantly.

bed and remain quiet until morning and then to report in person and bring a specimen of urine to my office.

Upon examination it was found she could see only the illuminated test chart and indistinctly 20/200 in certain fields. Tension was not elevated and there was no tenderness to pressure. Direct reaction to light of the right pupil was sluggish; the pupils were equal in size and ophthalmoscopic examination showed a large dark hemorrhagic area to the temporal side of the disc: to

Fig. 1. Appearance of fundus, January 3, 1923.

A prescription for a cylinder of plus 0.50 D. Rt., and a cylinder of plus 0.37 D. left axis 90° was given and she was requested to return every other day for treatment and observation of the lid condition—she felt much better after her glasses were secured.

On the evening of Jan. 1, 1923, while the patient was resting on a couch at home, she discovered that she had started to menstruate and at the same moment (according to her report) there was a twinge or peculiar sensation in her right eye, not very painful, and she discovered that no vision existed in this eye, except in the extreme outer fields. Calling me, she explained her plight, and I advised her to go to

make the examination easier a mydriatic was employed.

The vitreous was found clear and fundus details easily made out, the hemorrhage being confined or delimited above and below by branches of the superior and inferior temporal arteries. The most striking feature was the six yellowish smooth and more or less gleaming nodules or tubercles lined along the lower and upper limiting vessels. They seemed to be adherent to, or growing from the vessel walls, and seemed practically of the same size with the exception of the nodule nearest the disc on the lower side, which was very much elongated; however, the lower ones seemed at first glance

more pronounced, as the dark hemorrhagic area formed a most contrasting background. These nodules particularly excited my curiosity and interest, and I studied them in detail as to form and location. No other hemorrhages were present, no exudate, and no constrictions, dilatations nor changes could be seen in any of the arteries or veins. The large dense hemorrhage completely obscured all structures beneath it, the disc being covered in a sector where the superior and inferior temporal arteries emerge, and the area gradually became broader as it passed outward and forward toward the region of the ora serrata.

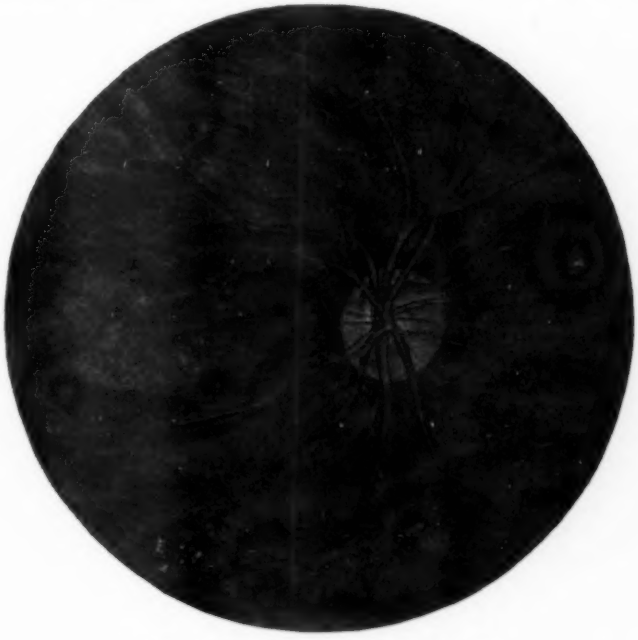

Fig. 2. Appearance of fundus, June, 1925.

Urine analysis proved negative for sugar and albumin, hence blood was drawn for an examination of sugar content as well as for the purpose of a Wassermann test. It was thought best to place a pad over the eye for a few days and potassium iodid, grains X, was prescribed for use by mouth t. i. d., and the patient sent to her family physician for a general physical examination.

The physical findings showed nothing abnormal in the lungs, heart, or abdominal cavity. Blood coagulation as well as blood pressure were reported well within normal limits; red and white blood count was normal. The patient was more or less a robust, healthy looking woman, weighing 170 pounds, having no aches or pains and complaining only of loss of vision in the right eye. No evidence of Graves' disease was present. Reflexes normal (with the exception of sluggishness of right pupil to direct reaction). History of all drug intake was negative. The menstrual history brought out the fact that as a girl menstruation had been somewhat painful but not since the birth of her first child. She had no miscarriages and her three children were all alive and apparently healthy. Her father had died at the age of 68 years, cause given as heart failure. Mother alive, and now well at age of 57 years. Recently it was found out that twenty years ago, when the patient's younger brother was an infant, the mother was in such poor health that she was not allowed to care for the baby, and that tuberculosis was at that time suspected. (This information was not known to the patient until fairly recently.) The mother had lost 8 children in early infancy, including

three miscarriages at the seventh month; all since the birth of our patient. There are now living five children; two brothers, aged 25 and 20 years, and two sisters, aged 30 and 27 years, all apparently in good health.

The second day the eye findings were the same. A colored fundus drawing was made and this I present to help in the description of the findings as seen at this time. Each eye showed a congestion of the bulbar conjunctiva of sufficient depth to be classed as an episcleritis which blanched readily by the

Fig. 3. Photograph taken recently showing changes in cornea of left eye.

instillation of a weak solution of epinephrin. The urine was again examined for albumin and casts, because a history of poor vision just before her last child was born had just been obtained; the urine analysis, however, was again found negative of pathologic findings.

The third day, it was noted that the nodules mentioned had faded considerably, and were less dense, and hence, less distinct in outline. A second examination of the mouth revealed what had appeared as well shaped, sound front teeth, were in fact, porcelains, held on pegs. She was referred at once to a dentist for examination, and even he thought they should all be extracted, and so recommended.

The fourth day, the nodules had almost faded away, and could only be seen with some difficulty—conjunctiva only slightly injected, the Wassermann test had been reported negative.

The fifth day, the nodules could absolutely not be seen. The media were clear, and in fact, the hemorrhagic area was considerably lighter in color or thinner, especially near and over the optic disc. The episcleral spots had also disappeared and the eyes were clear.

The following day, under gas and ether anesthesia, all teeth, 31 in number were extracted, and over 50% of the teeth showed a decided pathologic condition at or near their apices, and I felt that after this had been accomplished, I had removed the greatest source of all her trouble.

The seventh day, I started to administer sodium iodid, intravenously, in 20 c. c. doses; patient was instructed to continue her liquid diet and to remain in bed the greater part of the time.

The eyes remained clear of all episcleritis and each week for a month the hemorrhagic area seemed to be growing lighter in color; the left eye appeared normal in every way.

On March 7, after a week's absence from the office, the patient appeared with an episcleral spot of a fairly dark bluish color below the left cornea and over the insertion of the inferior rectus muscle. Both pupils were dilated for examination but no pathology noted in the left eye. The hemorrhage in the right eye seemed decidedly lighter in color, and in fact, the patient stated that the spot which had blocked her central vision previously was now of a lighter and reddish color.

Because of the change in the left eye, it was thought best to remove her tonsils, which were in a questionable condition. This, however, was not effected for a few days, when, under local anesthesia she was operated upon at the Hospital and caused to remain there for a few days, during which time the left eye improved of its episcleritis rapidly.

On March 31st, the upper part of the hemorrhagic area was found practically absorbed—the lower half remained rather dense. The left eye now presented a new episcleral spot over the

region of the insertion of the external rectus muscle; however, these were not painful to pressure.

The left fundus, very much to my surprise, showed a number of choroidal spots near the macular region. The vision in this eye was very little disturbed—in fact no perceptible reduction.

The following weeks the patient called irregularly and reported that the left eye would "flare up" if she was unusually active. This fact led me, despite the negative physical findings, to a firm belief in a tuberculous foci somewhere in the body as the primary cause of all the trouble.

The patient was seen very seldom until May 25, when my records show that considerable change had taken place in the right fundus; a number of pigment spots now were noticed along the lower border of the very much narrowed hemorrhagic area. However, the patient could read fairly small print with the right eye and the vision in the left eye was as good as ever before noted.

The patient was not seen again until June 11th, when she came in with a very much inflamed left eye. A new purplish spot was present over the region of the insertion of the superior rectus muscle. Vision, however, was 20/20 and that of the right eye 20/30. She was admonished to be less active and also to report a little more regularly for the purpose of observation. In the afternoons her temperature was found to be around 99° to 99.3. A von Pirquet skin test gave a most marked reaction, evidence of which was visible for a period of nearly two weeks.

A year after the date of the occurrence of the hemorrhage in the right eye, all evidence of it was gone including the pigment which had appeared at the lower border of the hemorrhage as first noted in the month of May. The right eye was perfectly clear and vision slightly better than 20/30.

Tho the right eye remained quiet and with good vision, the left eye developed a deep scleritis, which changed the refraction from a simple hyperopic astigmatism to a myopic condition of over one diopter. Vision was down to 20/100, but correctable to 20/20 by the addition of a minus sphere of 1.25 D. This myopic change was confirmed, that is, it coincided with the retinoscopic findings.

The patient very shortly after this was induced by friends to go elsewhere for treatment, and she tells me she entered a sanitarium a few months later, under the care of a specialist on tuberculosis. For a number of months she received injections of tuberculin, which at each injection, caused the left eye to become very red and painful. The eye was kept covered for some weeks but no oculist saw her during her stay at the sanitarium.

The fact that at times the local, focal, and general reaction was so marked, without any improvement in vision, caused the patient to become discouraged and she ceased to report to the physicians for further tuberclin treatment. The right eye remained quiet thruout, with vision normal for distance and near work.

On account of the damaged condition of left eye with less than 20/100 vision, not correctable, the patient decided to again come under my care; over two years after the original trouble.

The left eye now has numerous dense corneal opacities, extending inward from the region of the temporal limbus, and reaches practically, the midpupillary area; details of the fundus cannot be made out. (Fig. 3.)

Since the tuberclin was stopped, the left eye has "flared up" and been painful on three consecutive menstrual periods, which prompted me to send her to a gynecologist in a neighboring city, and tho he has not completed his observation, I feel or have hopes that some pelvic lesion will be discovered.

The ophthalmoscopic findings of the right eye in which no pigment is present and only a small amount of depigmentation noticeable, is to be seen in a second colored drawing made and presented, a period of over two years having elapsed between the times the drawings were made.

MECHANISM OF ACCOMMODATION CONFIRMED BY EXPERIMENTAL DATA.

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Beginning with the statement of the theories of Helmholtz and Tscherning as to the mechanism of accommodation, the anatomy and histology of the crystalline lens and related parts are cited to support the latter. The strong suspensory ligament transmits traction from the ciliary muscle to the lens capsule. The strong posterior capsule and its proximity to the resistant nucleus fixes the posterior pole of the lens and the peripheral cortex is compelled to move forward. Displaced aqueous escapes thru Schlemm's canal. Abstract of a paper read before the California Medical Association, 1925.

Helmholtz, with the information obtainable at his time, maintained that the act of accommodation is accomplished by a contraction of the ciliary muscle, which in turn relaxes the suspensory ligament of the lens and allows the lens to expand by its own elasticity, producing an increase in curvature which is the essential factor for near vision.

Tscherning, supported by brilliant experimental data, also maintains that the ciliary muscle contracts; but that instead of producing a relaxation of the suspensory ligament, increase of tension of the ligament takes place; and thereby the lens increases its curvature, not as a spherical body would, but by assuming a different shape in which the refraction near the optical axis is greater than towards the periphery of the lens.

EMBRYOLOGY AND ANATOMY.

Towards the third month of the fetal life the lens practically fills the whole cavity of the eye. At this time the posterior capsule of the lens is a most delicate, hardly perceptible membrane in immediate contact with the vitreous. This intimate contact is maintained up to full development of the eye.

It must be constantly borne in mind that the vitreous is not a fluid, but a tissue, that cannot be tampered with with impunity; and that it is of such a consistency that it will not escape out of the healthy eye after the sclera has been opened.

In the fully developed eye the posterior lens capsule is decidedly thicker than in fetal life and plays one of the most important roles in the act of accommodation. In fact, without the proper understanding of the tenacity and elasticity of this membrane, neither theory of accommodation is easily explainable.

In an extensive series of experiments which I conducted in the Royal Physiological Institute of Berlin in the year 1898-99 with a view of ascertaining the regeneration of the lens substance after trauma, I was struck by the fact, that upon making an incision in the posterior capsule of the lens in rabbits, whilst the process was watched by the rays of light from a frontal mirror, immediately the capsule was incised, it would violently retract, almost to the aquator of the lens; and I further demonstrated thru a large series of sections that the free edge of the capsule rolled upon itself several times, much in the same fashion as a released watch spring would do. When incision was made in the anterior capsule it would also retract, but to a considerably less degree; and the sections showed that the free edges were only slightly curled, or not at all, whilst the posterior capsule would be rolled upon itself four or five times over.

This fact, which had not been previously demonstrated, is to my mind of vital importance, as it renders the posterior capsule of the lens almost rigid towards the optical axis, where it is in close contact with the nucleus of the lens, whilst towards the equator, where the consistency of the lens substance is more fluid, the capsule might be distorted by traction, which is the case during accommodation.

PURKINJE'S IMAGES.

When a biconvex lens is held in front of a luminous point there are images formed by reflection upon the surfaces of the lens and also images formed by refraction thru the lens.

Of special interest to the understanding of accommodation is the study of the reflected images.

Tscherning invented and constructed a most ingenious apparatus called the

ophthalmophakometer, consisting essentially of a divided arc of a circle mounted on a stand with an observing telescope in the center of it; and travelling on it, several movable electric lights mounted on carriers placed above and below the arc in such a fashion that they would project a brilliant light into the eye.

The pupil of the observed eye would be dilated with cocain which interferes but slightly with the power of accommodation and the movements of the reflected images of the anterior and posterior surfaces of the lens were actually seen during the act of accommodation.

Thru innumerable measurements conducted in the Laboratory of Ophthalmology of the Sorbonne in Paris by Professor Tscherning and his associates, as well as by myself, who worked in this laboratory for over a year, it was definitely ascertained:

First—that the amplitude of accommodation diminishes towards the periphery of the pupil.

Second—During accommodation the anterior surface of the lens has a considerably greater curvature in the middle, whilst it flattens towards the periphery where it may even become concave. The displacement of the images whilst accommodating is not of an even motion; but they are displaced thru a series of trembling motions.

Third—Towards the end of the act of accommodation the image of the posterior surface of the lens is displaced downwards. This last item has been a source of considerable discussion as to its cause and significance.

HISTOLOGY.

As the vitreous increases in volume the lens diminishes in size until, in the adult eye, it has a radius of curvature of ten millimeters for the anterior surface and six millimeters for the posterior surface.

While the anterior capsule is lined with a single layer of epithelial cells up to the equator of the lens, *the posterior capsule* is a perfectly transparent homogeneous membrane, possessed of such an elastic and resilient power, as I have demonstrated, that when it is incised it instantly recedes far away from the incision, curling several times upon itself.

The central portion of the lens is at all times of a greater consistency than towards the equator. Appreciation of this very important factor, coupled with the tensile strength of the posterior capsule, is essential for the proper understanding of how the posterior surface of the lens does not, and cannot, flatten out, during the contraction of the ciliary muscle. Much in the same manner an egg shell is easily crushed if pressure is applied upon its short axis, but the resistance is very considerable when applied against the long axis. In other words, the principle of the strength of the cupola in architecture.

The next important item to consider is the *suspensory ligament.* We know that it is attached to the lens in a fan shape manner with fibers extending partially towards the anterior capsule, others exactly in the equator of the lens and others towards the posterior capsule. This mode of attachment insures a firm grasp on the capsule of the lens. It seems illogical to suppose that nature has contrived things in such a manner that this ligament would relax while in action, against all principles of ligament action thruout the human economy.

THE CILIARY MUSCLE.

Like all other muscles this one has its origin and insertion, and acts by virtue of its contractile power. Thruout the body the action of voluntary muscles is to shorten the distance between the origin and insertion of their fibers, thereby producing more or less complicated actions, according to the course and distribution of the muscle and its tendons. The ciliary muscle was discovered by Bruecke, who called it the tensor of the choroid, little knowing at the time how truly this title would apply.

The origin of the muscle is in the vicinity of the base of the iris and it consists of longitudinal fibers extending far back in the ora serrata; radial fibers, which are disposed, as the name implies, towards the suspensory liga-

ment; and finally circular fibers which would act as a sphincter.

It is of the greatest importance, in my mind, to notice the fact that the total volume of longitudinal and radial fibers is far greater, possibly fifty times more, than the circular fibers; and that the contraction of the radial and longitudinal fibers and their disposition with regard to the suspensory ligament, cannot mechanically produce any other effect but tension on this ligament; much in the same way that the contraction of any other muscle in any part of the body produces tension of its ligament.

It is proper to note here that one has no conception of the strength and tenacity of this ligament until one has had experience with the method of extracting the lens in its capsule.

In a relatively young subject, with not very pronounced senile changes in the lens, one is forcibly impressed by the amount of pressure that is necessary, often distorting the eye alarmingly, before any effect is produced towards rupturing this ligament; and we have all gone thru the experience of being compelled to abandon the task, for fear of endangering the eye. Surely such a strong membrane was not placed there by nature with a view of exerting its action thru relaxation as against all muscular action in any other part of the body.

The longitudinal fibers, extending as far back as the choroid at the ora serrata, are very numerous; and their action is to draw upon this membrane, which is separated from the sclera by a lymph space.

Please understand that this is not only a hypothesis, nor a mere assumption. As far back as the year 1868 Hensen and Voelckers, thru electrical stimulation, were able to demonstrate, by placing needles thru the sclera into the choroid, that at the time of contraction of the ciliary muscle the free end of the needle would move backwards, showing that the point was drawn forwards by action of the muscle.

The result of this action would naturally be to diminish the diameter of the interior of the eye, thereby producing pressure on the vitreous, and the resultant line of action of this pressure cannot be manifest except towards the posterior pole of the lens as the background of the eye is immovable because the sclera is fibrous and nonelastic.

The compression of the vitreous steadies the posterior surface of the lens, which, I have demonstrated, it cannot flatten because of its dome shape and because of the further resistence of the nucleus of the lens. But towards the equator this pressure of the vitreous, coupled with the pulling action of the radial fibers on the suspensory ligament, can and does flatten out both the anterior capsule and the posterior capsule, giving to the lens such a shape as has been conclusively demonstrated by very minute measurements of the reflected images, of both the anterior and posterior surfaces of the lens.

It would be natural to conclude that if a liquid were injected into the vitreous space experimentally an increased curvature of the lens should be produced, and such is indeed the fact. But by measuring this increased curvature it was found, that it was not like the curvature of accommodation; proving conclusively, as this experiment was carried on in dead eyes, that the power of the ciliary muscle is essential to flatten out the periphery of the lens, both anteriorly and posteriorly, near the equator; while towards the center of the eye, the curvature is considerably increased, as the nucleus is more or less a noncompressible body.

It could be naturally argued, the eye being a closed cavity surrounded by a rigid container and semifluids or fluids being incompressible, that no action could be exercised by the longitudinal fibers of the ciliary muscle as explained above. But it must be remembered that the eye contains a safety valve in Schlemm's canal; and the posterior wall of this canal is the starting point or origin of the ciliary muscle. Therefore, when the muscle contracts it enlarges the caliber of this canal, giving ready exit to the aqueous. A. Thompson has demonstrated that "The ciliary and iris muscles by trac-

tion on scleral spur opens Schlemm's canal and the ligamentum pectinatum."

As the anterior capsule of the lens is not at all as rigid as the posterior capsule its change in shape is, of course, more pronounced than that of the posterior surface; to the extent that sixty per cent of the accommodation is produced by the anterior surface and forty per cent by the posterior.

INCREASED THICKNESS OF LENS.

Maklakoff, a disciple of Tscherning, repeated and confirmed the measurements of Tscherning, and in addition conclusively proved that the lens increased in thickness during accommodation. In other words, that the anteroposterior diameter of the lens increased quite considerably during accommodation. This fact is simply mentioned by Tscherning as somewhat of a stumbling block.

Pflügk also has shown frozen cross sections of turtles eyes, under strong accommodation thru eserin, in which there is no question as to the increase of the anteroposterior diameter of the lens during accommodation.

The explanation of this item in my mind is as follows:

First—The nucleus of the lens is of a greater consistency than the outer cortex, which is semifluid. When the ciliary muscle contracts and tension is brought to bear upon both the anterior and posterior capsules, thru the suspensory ligament, the lens is rigidly supported posteriorly by the vitreous and by the resiliency of the posterior capsule. This combined action squeezes the semifluid cortex of the lens, which finding less resistance anteriorly, bulges the lens in that direction. It is also very probable that the contraction of the pupil at the time of accommodation has a bearing in the matter.

Reverting once more to the fact that the aqueous must constantly be escaping, and therefore constantly reproduced, in a rather rapid manner, there is no reason to disbelieve this; because the quantity used thru the action of accommodation is certainly nothing in comparison to a complete evacuation of the anterior chamber, such as is provoked by a paracentesis. It is a well known clinical fact that the reformation of the whole anterior chamber is but a matter of two or three minutes, which fact is also corroborated during cataract extractions.

A word of explanation as to the third phenomenon observed by Tscherning, that is to say: That towards the end of the act of accommodation the image of the posterior surface of the lens is displaced downwards.

This displacement is always downwards no matter what the position of the head might be. My interpretation is to the effect that the lens rotates slightly on its horizontal axis so that its superior border is tilted forward and inferior border naturally backward. This rotation is probably by virtue of an imperceptible rotation of the whole eye.

In order to understand my views, please make use of an ordinary biconvex lens and in a dark room reflect on it the light of a candle. Observing these reflected images you will notice that one is upright, corresponding to the anterior surface, and one is inverted, corresponding to the posterior surface; and that it is very difficult to keep these images from moving about due to the imperceptible movements of your hand holding the lens. Observe also that with the slightest tilting of the lens, the displacement of the posterior image is much in the manner observed by Tscherning. To my mind it is impossible for the lens to descend during accommodation, as it is firmly held in place as described above; while a slight tilting or rotation on the horizontal axis is certainly possible, and explainable to my mind as above indicated.

SUMMARY.

Rehearsing once more the whole question we may say:

First. That the Helmholtz theory does not support the facts as revealed by experimental data, for the reason that the contraction of the ciliary muscle enlarges the ciliary opening producing tension of the suspensory ligament and not relaxation.

Second. When the lens is removed from the young eye and allowed to assume the form given by its own elasticity, the shape of the lens is more or less globular or spheroidal which is not the shape that the lens assumes during the act of accommodation.

Third. The repeated and careful measurements of the displacement of the reflected images, of both the anterior and posterior surfaces of the lens, demonstrate conclusively that during accommodation the surface of the lens has a considerably greater curvature in the center than in the periphery, said shape being impossible if the lens is allowed to act on its own elasticity.

Fourth. That the trembling or jumping motion of the images during the accommodation is due to the vibratory action of all voluntary muscles, said vibration being imparted thru the ligament to the lens.

Fifth. That naturally the amplitude of accommodation diminishes towards the periphery of the pupil, that the contraction of the longitudinal fibers of the ciliary muscle exert traction on the choroid, tending to give further support and consistency to the vitreous, which in turn steadies the posterior surface of the lens.

Sixth. That because of the extreme tenacity and elasticity of the posterior capsule and also because of its dome shape, it cannot flatten out in the middle. But towards the periphery, where the cortex of the lens is considerably softer, it can and does yield to the action of the suspensory ligament.

Seventh. That the increase in thickness of the lens during accommodation is due to the double pressure exerted on the softer cortex, by the vitreous acting on the posterior surface and the ligament acting laterally, so that the component of these forces is a displacement of this softer mass towards the point of least resistance—the anterior capsule.

Eighth. That the descent of the image of the posterior capsule, when producing an extreme effort of accommodation, is due possibly to a very slight tilting of the lens in its horizontal axis, and also very probably by slight motion of the eye itself.

Ninth. One must not lose sight of the fact that all involuntary muscles maintain a state of "tone," during the conscious state of the body; and that therefore there is at all times a slight tension exerted by the ligament, on the one hand by virtue of the tone of the ciliary muscle, and on the other by the traction produced because of the elasticity of the lens capsule, principally of the posterior capsule.

Tenth. That all of these facts are possible, because of the action of Schlemm's canal acting as a safety valve in the anterior chamber.

An additional change that is noticed during extreme accommodation is a deepening or flattening of the angle of the iris in the anterior chamber, due to the traction of the ciliary muscle in that region.

It seems to me then that the validity of the Tscherning theory of accommodation as against that of Helmholtz is firmly established by all experimental data; and that all clinical facts, as well as the information furnished by anatomy, physiology and histology, are in support of this contention.

In closing this study I must make particular mention of a very recent article published by my esteemed friend, Alexander Duane, M. D., of New York City, in the AMERICAN JOURNAL OF OPHTHALMOLOGY, March, 1925, entitled, "Are the Current Theories of Accommodation Correct?" Dr. Duane has made a detailed study of the amplitude of accommodation in several thousand cases, and bases his assumptions and conclusions in accordance with the way he understands these theories.

He announces the Helmholtz theory with absolute correctness, as we all understand it; and as a result he is unable to reconcile the clinical facts with said theory, confirming once more and from a different angle that Helmholtz's hypothesis is incorrect.

However, Dr. Duane does not conclude that Tscherning's theory either is correct. The reason for this confusion is very definite in my mind, from Duane's statement of Tscherning's theory. I can readily see that the doctor is not familiar with the facts, as expressed and demonstrated by

Tscherning. I must quote Dr. Duane to prove my contention. The doctor says: "But according to Tscherning the lens expands by virtue of a direct pressure exerted on it by the ciliary muscle."

I have Professor Tscherning's works in my possession. I have also worked with the master, and I can safely state that at no time has such a contention been made. It is possible, however, that Dr. Duane has a clear understanding of Tscherning's works, but that in expressing his views has been unfortunate in the construction of his phrase, for his conclusions are decidedly favorable to, and explainable only by virtue of Tscherning's views as against those of Helmholtz.

350 *Post St.*

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STUDIES IN PERIMETRY. I. PRELIMINARY WORK ON A DIAGNOSTIC SCALE FOR THE FORM FIELD.

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The boundaries of the form field for a white stimulus subtending an angle of 1 degree have been tested in two hundred cases. The areas included within these boundaries have been represented by two methods and the results shown in the accompanying charts. The work has been done in the Graduate School of Medicine of the University of Pennsylvania and the Wills Eye Hospital.

During the past several years papers have been published by two of the present writers describing the apparatus and controls which are required for accuracy and precision in perimetry[1]. The work reported in these studies, however, constitutes only a part of the program which is needed to make perimetry serve a widely useful purpose. A means has yet to be provided for adapting the type of perimetry described to the work of the office and clinic and other fields of application. The present paper is the first of a series designed to carry out this purpose. The studies in this series have been made under the auspices of the Laboratory of Physiological Optics of the Graduate School of Medicine of the University of Pennsylvania.

The determination of the form field has two important clinic uses—a study of the advance and recession of a given pathologic condition, and diagnosis. Both of these uses demand a high precision of working, and a careful control of the variable factors which may influence the result. This precision has been attained within a very small limit of error, insofar as the reproduction of the results for a given individual is concerned. The study of an individual case, therefore, can be made with a degree of accuracy comparable with the most highly developed types of laboratory testing. In diagnosis, however, we have to deal not only with the factors which may cause a variation in result from time to time in an individual, but also with those which differ from individual to individual. These latter factors are being studied at the present time, but the work is not yet completed. Some of these factors may be amenable to control; the greater number, however, in all probability can not be controlled by any procedure which would be feasible for practical work. Two of them at least must always remain outstanding: the normal variation in the sensitivity of

the retina and in the distribution of sensitivity over the retina.

A highly necessary first step therefore towards the successful use of either the form or color fields for diagnosis is the determination of the range of variation which may be expected for non-pathologic cases. This determination of a norm for the nonpathologic cases and the normal range of variation from an average or median result, is obviously even more necessary for the successful practice of perimetry in its applications to diagnosis and other practical work than the analogous determinations for acuity. In neither case have determinations been made with regard to both of the features indicated above, nor with regard to either with an adequate standardization of factors. In these respects the work in perimetry in particular has been greatly neglected. To make such determinations effective for the practice of perimetry, the following are some of the conditions that must be fulfilled.

(1) They must be made under a prescribed set of conditions which can be widely reproduced. Until the necessity of this constancy of conditions is thoroly understood any plan for calibrating a scale for diagnostic purposes must fail. The wide differences in result which are obtained when care is not taken to control the conditions under which the fields are determined, have been shown in previous papers. An obvious requirement for the validity of application of any scheme of calibration is that the scale which is determined shall be applied only to results obtained under the same conditions as those for which the scale was made.

(2) The results must be treated in such a way as to show the range and distribution of cases as well as the average case. Previous writers on this subject seem to have been content to give the breadth of field in the principal meridians in the average case, or at most only a small range of variation on either side. The knowledge of what is an average field obviously contributes but little to the diagnosis of the cases for which the help of perimetry is most needed. If a pathologic condition is to be diagnosed in its incipiency, the borderline between the normal and the pathologic must be located within reasonably narrow limits. For example, a given field may be much smaller than the average and still fall within the range of normal variation. An adequate scheme of calibration of perimetry for diagnosis should consist therefore of a scale made up of two plots, similar in principle to the well known frequency curve, one for pathologic, the other for nonpathologic cases. In each of these plots the cases should be grouped with reference to size of field along the same coordinate. Such a scale provides a means of placing any new case in the class or group to which it belongs rated with regard to size of field. In obtaining the data for the nonpathologic plot the cases should be sampled broadly to include as many as possible of the outstanding variables. The present determinations which represent only the beginning of the work, have been made to include two of the most important of these variables, namely, age and condition of refraction. The data and range of conditions covered will be increased as opportunity offers.* The data for pathologic cases will not be dealt with at all in this paper.

(3) If extent as well as shape of field is to be used as a diagnostic feature, some accurate means of comparing extents must be had. The means employed at present seem to be a comparison of width of field in the different meridians or an inspection of the plotted fields. Neither of these methods is convenient and in many cases they lead to no definite conclusion. Some fields may be broader in certain meridians and narrower in others than another field or any field or range of fields accepted as standard. The need of a single value or index which will fairly represent the extent of the field

*It is obvious that the scale presented in this paper may be filled out by each physician from the patients which he examines in his own practice. With 200 cases as a nucleus a scale can soon be formed which will serve a very useful purpose in diagnosis.

is obvious. One solution of this problem is to plot the field to a standard scale and to measure its area with a planimeter. This would be the customary scientific procedure. It would necessitate however that the fields always be plotted to a standard scale or the results be corrected to that scale, and would require, besides, the use of an instrument which may not always be included in the equipment of the office and clinic. For these reasons it has been deemed advisable to find an alternative plan of treating the results which can be used when desired as a substitute for planimetry. A number of methods have been tried and the results checked against those obtained with the planimeter to see which gave the closest agreement. Fortunately a very simple method was found which gives a high correlation with the results obtained with the planimeter. In this method the grouping was based on an average value computed by adding together the distance of the limit in degrees from the center of the field in the several meridians as read from the arc of the perimeter and dividing this sum by the number of meridians in which the determinations were made. This result may be called the average breadth of the field. With regard to this comparison it is only fair to state, however, that the rankings given to the fields by the two methods were not always the same. In such a case it is not easy to decide which method should be used nor, quite aside from considerations of convenience and serviceability, is it easy to say which more correctly represents the distribution of sensitivity over the retina, when the limits are determined only in a comparatively small number of meridians. Obviously either method might be adopted for the purpose of determining norms and of making comparisons with these norms for diagnostic purposes. Results for both methods have been included in this paper.

Conditions Under Which the Fields Were Taken. The experimental work was done on the Ferree-Rand perimeter. This perimeter was designed for the control of all the variable factors which affect the determination of the form and color fields for a given eye. Among the special features and devices of this perimeter, the following may be reviewed here: A means of illuminating the perimeter arc such that every point on the arc in any meridian in which it may be placed receives light of equal intensity and of daylight quality; a means of controlling the brightness of the preexposure and the surrounding field; devices and adjustments for the accurate location of the eye at the center of the perimetric system and for securing a steady and precise control of fixation; special fixation controls for eyes suffering from presbyopia, high degrees of hyperopia, myopia, low central acuity and central scotomata; attachments for studying the blind spot and for refracting the peripheral field; a tangent screen or campimeter attachment, subtending a visual angle of 70 deg., which can be equally illuminated at every point on its surface and with which all of the fixation devices noted above can be used; etc. With such an instrument all of the external conditions of the test can be held constant and be reproduced at will.

The fields were determined with a white stimulus on a black background. The angle subtended at the eye by this stimulus was 1 deg. Its illumination at every point in the field was kept constant at 7 foot-candles. The cases examined included private patients, nurses, assistants on the hospital staff, and a large number of clinic patients. In every instance the refractive condition of the eye was determined and an ophthalmoscopic examination was made. No case showing a pathologic condition, however slight, was included in the series. Ample rest periods were allowed between observations and care was exercised that no field should be taken when the observer was suffering from general fatigue or was otherwise unfit for accurate work. All determinations were carefully checked but the observer was not given extensive preliminary training. It was not the purpose of the writers to make examinations for the determination of norms under condi-

tions differing in this respect from those which obtain in ordinary ophthalmologic work. The results obtained represent therefore a fair sample of the fields that may be expected in an average group of untrained observers who show no pathology.

RESULTS. Fields were determined in 8 meridians (0, 45, 90, 135, 180, 225,

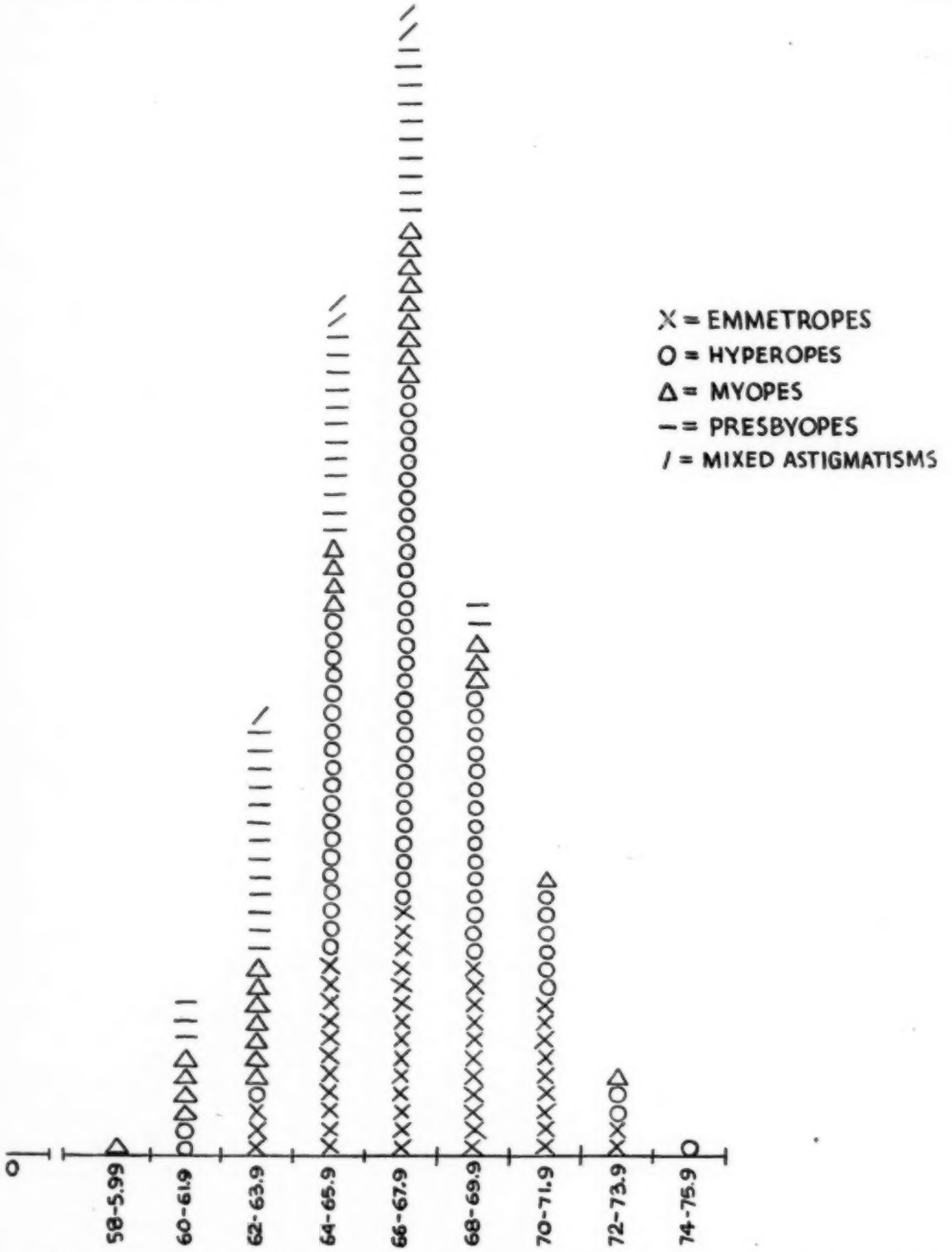

Fig. 1. Showing the distribution of 200 nonpathologic cases. These observers were selected to include cases of emmetropia, hyperopia, myopia, presbyopia and astigmatism. The distribution is based on the average breadth of field in the eight principal meridians. Breadth of field is plotted on the horizontal coordinate and number of cases on the vertical coordinate.

270, and 315 deg.) for 200 eyes. The eyes examined included 75 cases of hyperopia and hyperopic astigmatism, 30 cases of myopia and myopic astigmatism, 40 cases of presbyopia, 5 cases of mixed astigmatism, and 50 cases showing no error of refraction or an error no greater than 1 diopter of hyperopia or 0.25 diopter of hyperopic astigmatism. This latter group contained no cases of myopia or myopic astigmatism. For convenience of treatment it will be referred to as emmetropic.

A graphic representation of the results is given in Figs. 1 and 2. In Fig. 1 the cases are rated on the basis of the average breadth of field in the 8 meridians, expressed in degrees. The total range of average breadth of meridian for the 200 cases was from 58 to 76 deg. For the purpose of grading and representation in the plot the cases were separated into 9 groups, each group covering a range of 2 deg. The number of cases falling in each group is shown on the vertical coordinate. The cases are designated with regard to condition of refraction according to a key shown in the chart.

The results may be summarized as follows:

(1) In general the emmetropes and hyperopes have the wider fields, the myopes, the narrower fields.

(2) Ranked from narrowest to widest the percentage of cases falling in each group is as follows: 0.5, 4.5, 12.5, 24, 32, 15.5, 8, 2.5 and 0.5.

(3) The myopes constitute all of the first group, 44.4 per cent of the second group, 28 per cent of the third group, 8.4 per cent of fourth group, 14.5 per cent of the fifth group, 9.7 per cent of the sixth group, 6.2 per cent of the seventh group, 20 per cent of the eighth group, and none of the ninth group. The presbyopes form no part of the first, seventh, eighth and ninth groups; they form 33.3 per cent of the second group, 52 per cent of the third group, 25 per cent of the fourth group. 14.5 per cent of the fifth group, and 6.5 per cent of the sixth group. Emmetropes are not found in the first, second and ninth groups; they form 12 per cent of the third group, 23 per cent of the fourth group, 22.6 per cent of the fifth group, 35.5 per cent of the sixth group, 56.2 per cent of the seventh group, and 40 per cent of the eighth group. No hyperopes are found in the first group; they form 22.2 per cent of the second group, 4 per cent of the third group, 39.6 per cent of the fourth group, 46.8 per cent of the fifth group, 48.4 per cent of the sixth group, 37.5 per cent of the eighth group, and all of the ninth group.

(4) The distribution obtained, it is interesting to note, is of the type frequently found when a large number of measurements is made of some physiologic or psychologic characteristic. That is, the bulk of the cases cluster around a median value, fewer and fewer occurring as this value is receded from. Whether or not the frequency distribution of field size in nonpathologic cases will be found to fit the normal or Gaussian curve as many other physiologic traits have been found to do, can not be determined until a much larger number of cases has been investigated. The approximation is perhaps as close as can be expected with 200 cases.

Our strongest interest in these results is, of course, their diagnostic serviceability. In discussing diagnostic possibilities the fact must be recognized that in this as in most physiologic studies it will be difficult to draw a sharp line between pathologic and nonpathologic cases. A certain amount of overlapping is to be expected. There will in all probability be a borderline group whose status is doubtful. Indeed one of the chief incentives for refining a test for diagnostic purposes is the desire to reduce the number of cases which must be defined as borderline. Altho 200 is a small number of cases from which to generalize or attempt to form a diagnostic scale, there are a few conclusions which may be drawn from the results obtained with a fair degree of confidence. An examination of Fig. 1 shows for example that there is only one case whose average breadth of field is less than 60 deg. It may be safely concluded, therefore, that any field which has an average breadth of less

than 60 deg. must be regarded as suspicious. It will be noted also that there are only 6 cases of emmetropia and hyperopia out of a total of 125 for which the average breadth of field falls below 64 deg. This would seem to justify the conclusion that emmetropes or hyperopes with an average breadth of field less than 64 deg. should be classed as doubtful. Probably we can

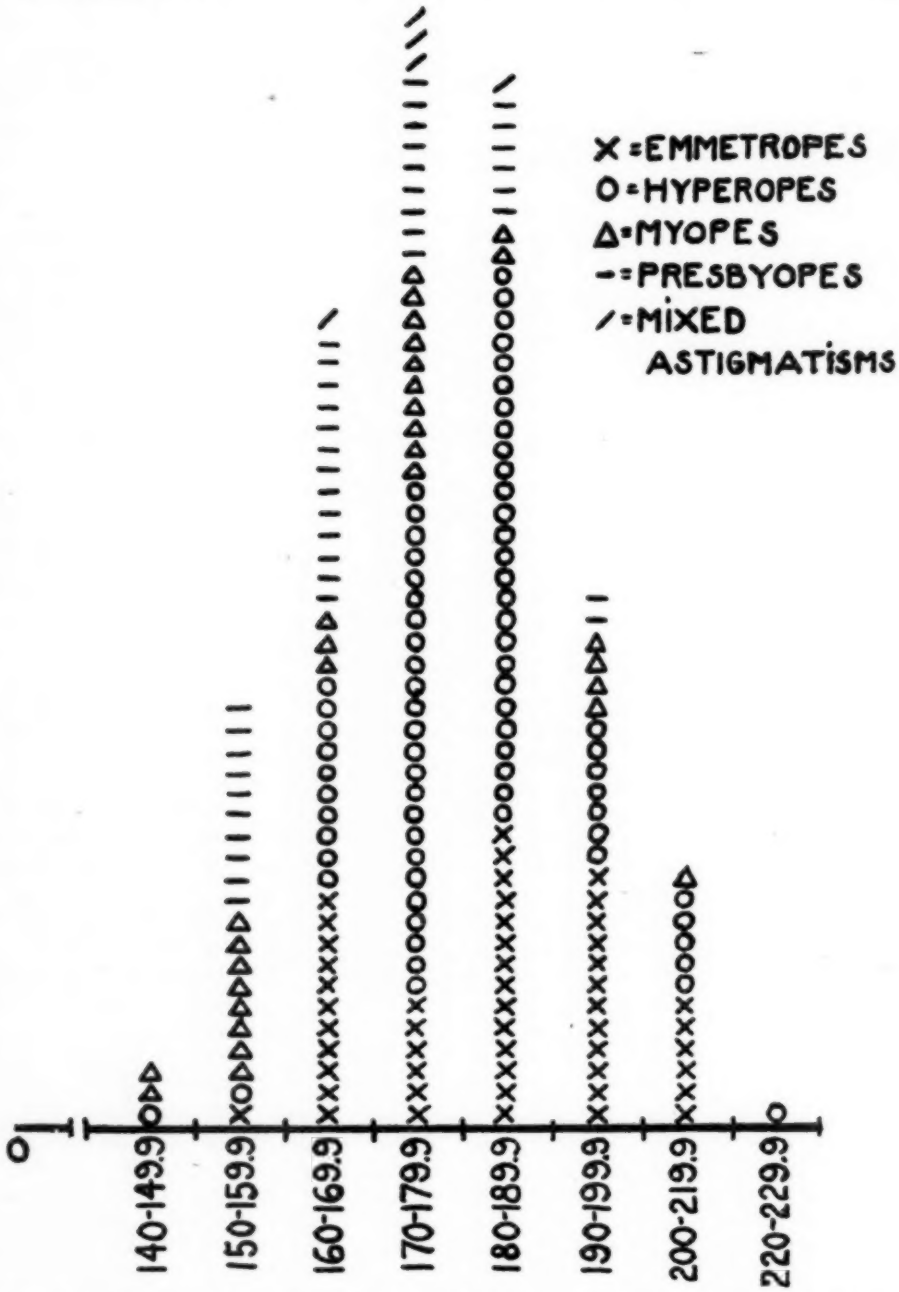

Fig. 2. Showing the distribution of 200 nonpathologic cases. These observers were selected to include cases of emmetropia, hyperopia, myopia, presbyopia and astigmatism. The distinction is based on area of field as measured with a planimeter from maps drawn to a scale of one degree to 1.2 mm. Area of field in square cm. is plotted on the horizontal coordinate and a number of cases on the vertical coordinate.

add too that a myope or presbyope with an average breadth of field less than 62 deg. should be classed as doubtful. The differentiation here, however, is not so clean cut and incisive as in the other cases. In later papers, not only will the data given here for the nonpathologic cases be increased, but comparisons will be made with a large group of pathologic cases in order to give a better understanding with regard to what extent overlapping may be expected. In this connection it should be remembered that we are dealing here only with the more difficult and discouraging aspects of diagnosis by means of the form field, namely extent of field. Changes in the shape of the field are in general much less difficult to evaluate, partly because of the kind of change which is apt to take place as the result of a pathologic condition, and partly because there is a smaller normal variation in shape as compared with size.

In Fig. 2 the results are shown in terms of area of field as measured with the planimeter. The maps measured were drawn to a scale of 1 deg. to 1.2 mm. The total range of area in sq. cm. for the 200 cases was from 140 to 230. In this figure it was deemed advisable to arrange the cases into 8 groups instead of 9, each group covering a range of 10 sq. cm. The number of groups obtained depends of course upon the range selected to form a group. As before, the number of cases in each group is represented on the vertical coordinate and the range of the group on the horizontal coordinate. The condition of refraction of the cases is designated according to the key given in the chart.

In Fig. 3 fields have been plotted to show graphically the more important facts noted above. In this map are given the largest field found, the smallest field, the average field for the 200 cases, and the widest field of each of the two groups which we have called borderline or suspicious. Of these latter two, X represents the widest of the fields whose average breadth falls below 62 deg. Any field smaller than this we have called suspicious for myopes or presbyopes. Field Y represents the widest for the 6 cases of emmetropia and hyperopia whose average breadth was less than 64 deg. Fields for emmetropes or hyperopes smaller than this we would regard as suspicious. An inspection of this map should give a good idea within what limits a field should fall to be within the normal range of variation.

It may be of interest to add here for comparison some data on form fields taken in the Bryn Mawr College laboratory.* With regard to these data the following points may be noted:

(1) The 15 observers used were all under 24 years of age, showed no errors of refraction when examined without a cycloplegic, and had an acuity of 6/6 or better under 5 foot-candles of illumination. Sixteen of the cases in the clinic group showed no errors of refraction without a cycloplegic and had an acuity of 6/6 or better. Their ages ranged from 13 to 29.

(2) The fields were determined in 16 meridians instead of 8 and the observers were given enough practice to secure in each case a close reproducibility of result. The same stimulus and external controls were used as in the preceding work. The method was in general the same with the exception that the greater care and precautions possible in laboratory work were used. It is encouraging and significant to note that such a close agreement can be obtained in a clinic and a laboratory, with a different number and class of observers, different experimenters and for 16 meridians instead of 8, when the work is done with the controls we have selected as standard. Unfortunately, however, this close agreement between clinic and laboratory results has not been found for the color fields. A different standard of work is

*These fields were taken by F. Selligman and R. Beardsley, students in Bryn Mawr College. The cases for the clinic group were obtained from the Wills Eye Hospital as well as from the clinics of the Graduate School of Medicine. We take pleasure in acknowledging our indebtedness to the chiefs of these clinics who permitted us to use their patients as observers, also to their assistants and the residents of the hospital for help in procuring suitable cases.

required to give a high precision of result in the determination of the color fields than is required in the determination of the form field.

The average breadth of field in the 16 meridians for the 15 observers used in the laboratory determinations was 67.52 degrees; the average in the clinic determinations was 66.38 degrees. The average for the emmetropes and hyperopes of the clinic group was 67.30 degrees; for the myopes and presbyopes, 64.94 degrees; and for the emmetropes alone, 67.38 degrees. The range for the 15 observers was from 62.25 to 72.60 degrees; for the 200 observers, it was 58 to 76 degrees. The range for the clinic group was 72 per cent greater than for the laboratory group. The average, the widest and the narrowest fields for the laboratory group are given in Fig. 4.

SUMMARY.

In former studies by two of the present writers the factors which cause variability in the form and color fields for a given eye were determined and methods and apparatus were devised for their control. This has rendered the use of perimetry for the advance and recession of a pathologic condition comparatively simple and easy. The use of perimetry in diagnosis, the other important application to clinic work, could be made equally easy if the same degree of control could be exercised over the factors which cause

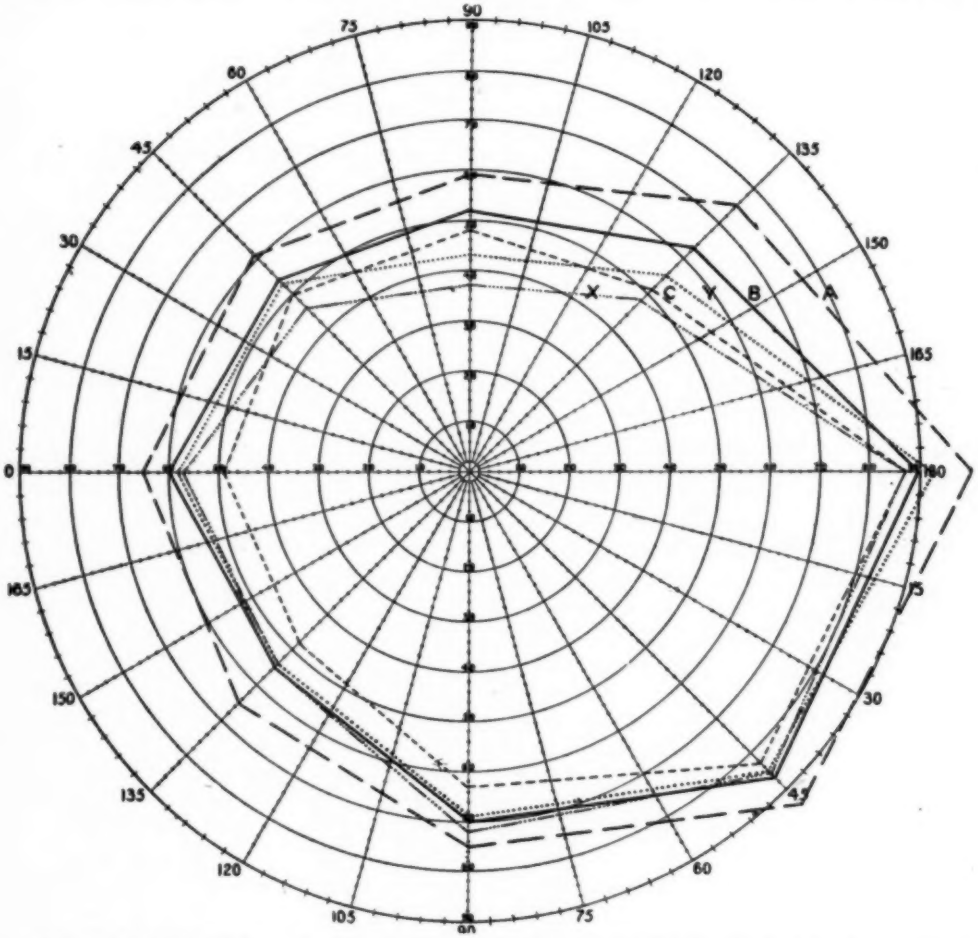

Fig. 3. Showing the widest field A, for 200 nonpathologic cases; the average field B; the narrowest field C; and the sizes of field which may be regarded as borderline, X myopes and Y emmetropes and hyperopes.

the results to vary from eye to eye. This degree of control has not yet been secured and in all probability can never be secured. At present the outstanding problem in perimetry, therefore, is diagnosis.

The first step in diagnosis is the differentiation of the pathologic from the nonpathologic eye. In case of the form field this differentiation is based on two phenomena: changes in the size or extent of field and changes in the shape of field. Size of field, it is obvious, is more affected by the nonpathologic factors which vary from eye to eye than is shape of field. The effect of these factors on size of field is to increase the range of variation for the nonpathologic eye and the tendency to overlap the range for the pathologic eye. For example, the amount of contraction of field produced by a defect or refraction in a nonpathologic eye may be as great or even greater than that produced by an incipient pathologic condition in an emmetropic eye. In the use of perimetry for diagnosis it becomes necessary, therefore, to make for the nonpathologic eye a careful determination of the range of variation of field for all of the outstanding, uncontrolled variables and for as many of them separately as is possible in our present state of knowledge. The knowledge of what is an *average* field, for ex-

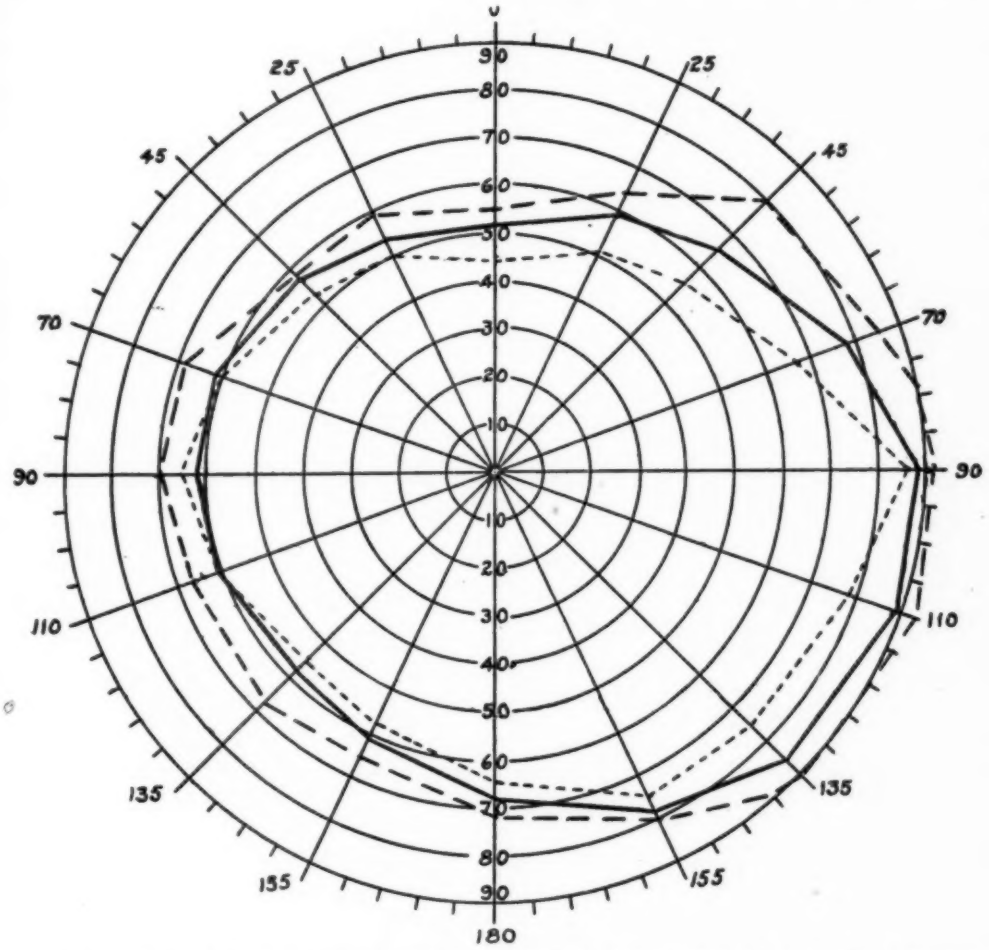

Fig. 4. Showing the widest average and narrowest fields for 15 nonpathologic cases. These observers were free from errors of refraction when tested without a cycloplegic, under 26 years of age and of normal acuity or better. The fields were taken in 16 meridians and under laboratory conditions.

ample, can contribute but little to the diagnosis of borderline cases for which the help of perimetry is most needed.

It has been the purpose of the present study to determine the range of variation of the form field for the nonpathologic eye for a stimulus subtending a visual angle of 1 degree. The cases studied were sampled to include as many as possible of the outstanding variables which are not pathologic. Two of the most important of these are age and condition of refraction. A scale has been formed showing the range of variation of field under the influence of these variables and the distribution or frequency of occurrence of the different sizes of field in a typical nonpathologic group. Such a scale provides a means of placing each new case in the class or subgroup to which it belongs rated with regard to the distribution of normal cases, i.e., it constitutes a diagnostic scale for use in the separation of pathologic from nonpathologic cases.

In the formation of this scale it has been necessary that a single value or index be chosen to represent extent of field. A number of values has been tried. Of these average breadth of field and area of field in sq. cm. of maps drawn to standard scale and measured with a planimeter were finally selected as the most feasible and satisfactory for office and clinic work.

Bryn Mawr College.

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BILATERAL GLIOMA OF THE RETINA.

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In the case here reported poor vision was noted when the child was nine months old. Both eyes were found involved and were enucleated within a month. There was no evidence of recurrence five months later. Read before the Brooklyn Ophthalmological Society, December, 1924.

Intraocular tumors always present a serious problem and this is especially so when they are bilateral. The case now reported falls in this category.

The cause of these tumors is unknown, but their congenital character is notable. Its occurrence is equally divided between the sexes. 94% of the cases develop before the age of 4 years[1] and it is not found after 14 years. It occurs frequently in the same family. Statistics of the Royal London Ophthalmic Hospital[2], covering a period of 42 years, show a ratio of 0.1% to all other eye conditions. 23% of all cases are bilaterals[3]. Glioma in the second eye appears to be an independent growth and not a metastasis from the first eye, therefore in bilateral glioma a cure may follow double enucleation[4].

Case: L. F., age 12 months, male, white, of American parents. For 3 generations, there is no history suspicious of tuberculosis, cancer or syphilis. Father and mother in good health. There are 4 other children, none of whom show any eye condition. Three months prior to July 1, 1924, the time of examination, the mother noticed that the left eye turned out and that the child did not see as well as previously. There was no history of any illness or eye inflammation.

Examination of right eye showed, lids, conjunctiva and cornea normal, extraocular movements normal. The pupil was 6 mm. in diameter and reacted to light. There was some vision in this eye as he would follow movements of a light or hand. Tension normal to finger palpation. Anterior chamber not shallow. Thru the undilated pupil, with ordinary pocket electric light, there could be seen a yellow mass, over which coursed numerous blood vessels. With the electric ophthalmoscope, thru the dilated pupil there could be seen a yel-

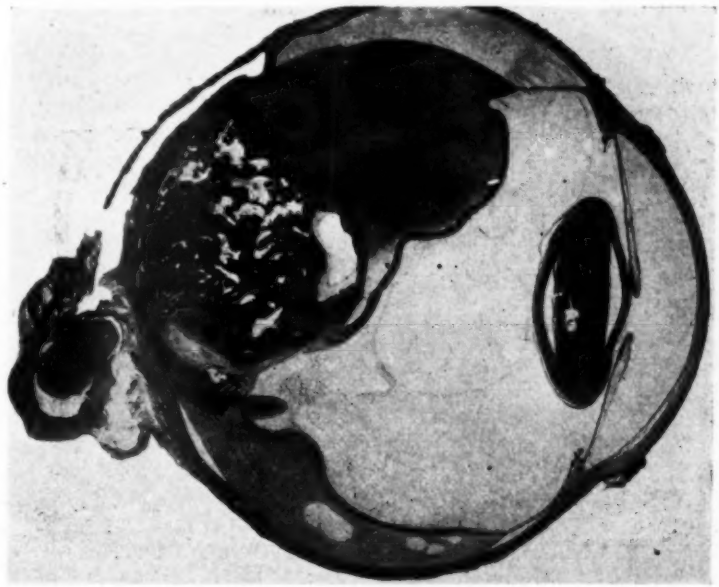

Fig. 2. Glioma of Retina, Right eye; showing retina pushed forward against the lens except part that runs back, like remains of hyaloid canal, toward large tumor mass at back of vitreous.

low lobulated mass, as described; seen best with a plus 20 diopter lens.

The left eye showed normal lids, conjunctiva and cornea, there was a proptosis of 5 mm., with a divergence of 4 mm., not paralytic. Apparently no light perception. The anterior chamber was shallow, with an increase of intraocular tension to fingers. With electric pocket light, there could be seen, directly behind the lens a yellowish grey mass over which coursed numerous blood vessels.

A complete and careful physical examination did not reveal any pathology, except enlarged, anterior and posterior cervical glands. An X-ray of the head, July 15, 1924, by Dr. A. L. L. Bell did not reveal any evidence of metastatic tumor. The case was seen by Dr. Henry M. Smith who agreed with the diagnosis of bilateral glioma.

The parents were informed of our opinion of cancer and were told that the growths would perforate the eyes and then develop elsewhere in the body. At best he had but a few years to live. If the eyes were removed, promptly, the chance of recurrence was very remote.

They consented to the removal of the left eye and if pathologic examination showed it to be malignant, to be followed by the removal of the right. The left eye was enucleated by the writer July 15, 1924 and ½ inch of nerve was taken in this procedure. The orbit seemed free of any nodules.

Section of the eye and pathologic examination by Dr. A. Murray of the Hoagland Laboratory shows a glioma of the retina, near the nerve, occupying ¼ of the vitreous chamber. The cells are of the low cuboidal form and arranged in rosettes. There was considerable lime salts present, making cutting of the sections very difficult. The optic nerve and sclera did not show any evidence of involvement. Fig. 1. Photo "A."

The right eye was enucleated by the writer July 29, 1924. Examination by Dr. Murray, showed a glioma of the retina, arising near the nerve, occupying ⅓ of vitreous. The tumor cells had involved the remnants of the hyaloid canal, but the optic nerve and sclera were not involved. The tumor was of the rosette type, containing considerable lime salts as found in the left eye. Fig. 2. Photo "B."

Glioma of the retina develops in the neuroepithelial layer[5], it is never pigmented and is likely to undergo cal-

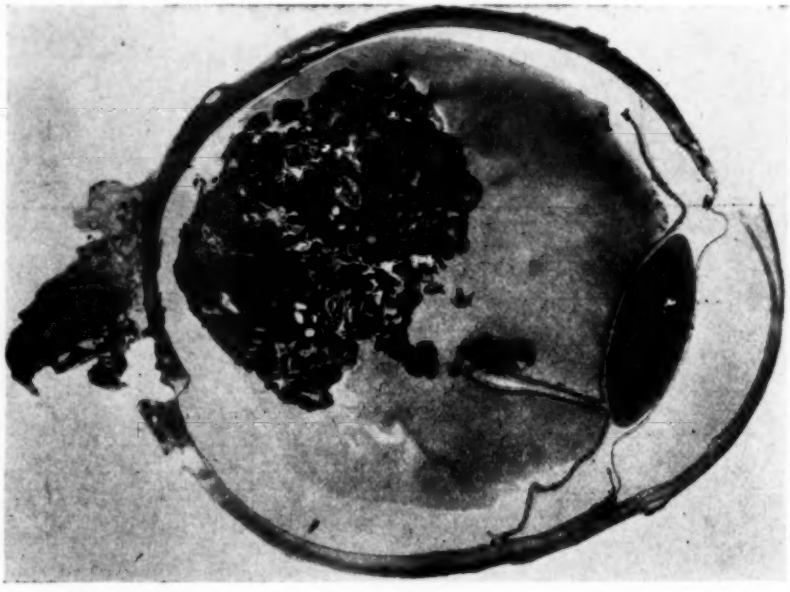

Fig. 1. Glioma of Retina, Left eye. Retina detached far forward running back to tumor mass at posterior pole of eye.

careous degeneration. It is composed of small round cells, appearing often as naked compact nuclei, but exhibiting a scanty cytoplasm, from which as a rule, no definite fibrils can be traced. The cells lie usually in perivascular groups, between which there may be diffuse cellular tissue or more often necrotic detritus. Besides the perivascular groups, two other features are revealed. (a) The inner border of the typical rosettes is lined by a thin membrane, which has been interpreted as a reproduction of the membrana limitans externa, while the cells of the rosettes are believed to be derivations of the rods and cones. (b) Even when the rosettes are not prominent the small cells are not diffusely distributed, but are arranged in rows and distinct circles, which indicates traces of the same tendency which produces the complete rosettes[7].

An eye enucleated for glioma should be microscopically examined in serial sections; and if tumor elements have passed into or beyond the sclera, the orbital contents should be immediately removed. Recurrence frequently is due to the neglect of this precautionary measure[8].

This child has been under observation monthly since recovery from the last operation, has gained weight and there has been no evidence of orbital involvement.

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RETINOSCOPY WITH CYLINDERS.

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The exact determination of astigmatism, by the trial of correcting cylinders in this objective test, is here described. The changes induced in the light movements within the pupil are described, when the cylinder is of right strength, too strong, or too weak, and properly placed, or turned either way from the true meridian. Contributed from the Department of Ophthalmology in the State University of Iowa College of Medicine; and read before the Colorado Congress of Ophthalmology and Oto-Laryngology, August 14, 1925.

It has always seemed to me that any accurate method whereby we may make refraction more of an objective test and less of a subjective one, should be well received and used by oculists; not only because it puts the test in our own hands and is a time saver, but also because it gets us away from the methods used by optometrists. And again we must not forget the psychologic effect on the patient which results from doing away with, to a great extent, the subjective method. I feel quite sure that retinoscopy with cylinders fulfills this need. If the oculist is skillful with the retinoscope, as he should be, a great percentage of cases may be corrected to within one-fourth of a diopter by its use, and I venture to say this is as close or closer than we often get by the subjective method; especially is this true in children, the illiterate, and other types of cases which do not respond well to subjective tests.

Of course we all know that it is the astigmatic error which must be most accurately corrected if we are to give the patient relief. We often reduce a plus sphere and perhaps slightly overcorrect a minus one, but it is certainly unusual to change either the focus or axis of the cylinder as found. In the use of the retinoscope, after the usual method, we have no way to determine just what the accommodation is doing

while we are correcting each meridian. We are all forced to use homatropin in a large number of cases and it is a well known fact that this drug does not produce complete cyclopegia, consequently during the determination of each of the principal meridians, we probably have varying amounts of accommodation in force, and if this is the case, our cylinder will not be accurate as to strength. Then again, when we employ this method, it is only a guess and an approximation of the cylinder axis. By the use of cylinders in retinoscopy we correct these errors and also we are able to check the accuracy of our end result. In a very high percentage of cases this correction cannot be changed at the trial case.

In the method which I am about to describe we correct the first principal meridian in the usual way, gradually building up our sphere to the point of reversal; this gives us our spherical correction. Now we have remaining only an astigmatic eye, the ametropia of which is really nothing more nor less than a cylinder. To neutralize this cylinder all that is necessary is to place in front of the eye a cylinder from the trial case which lies at the same axis and is of the same focus but of opposite sign. This, as you see, is simply a problem comparable to lens neutralization. To obtain some idea as to the axis of the cylinder which will be necessary to correct this astigmatism, we note the direction of the long axis of the band of light which remains following our correction of the first principal meridian. In order that we may approximate the strength of the cylinder it is probably better, especially if we are just beginning the use of this method, to complete our retinoscopy in the usual manner, and to note the difference in strength of the two spheres which correct the lower and the higher principal meridians. This will be an approximation of the strength of the cylinder. Allowing the sphere which corrected the first principal meridian to remain in place, we add to this a cylinder of the approximate axis and strength noted from the afore mentioned test. We now find one of several conditions obtaining:

IN COMPOUND HYPEROPIC ASTIGMATISM

1st. Sphere correct and cylinder correct as to focus and axis. If this is the case all meridians are neutralized and there is no perceptible movement of light.

2nd. Sphere correct and cylinder correct as to axis but undercorrected as to strength. Our first principal meridian remains as before the addition of a cylinder, that is, at the point of reversal, but we continue to have a with-band of light (with the plane mirror) in the same axis as formerly. It remains but for us to increase our cylindrical strength, maintaining the same axis until we arrive at the point of reversal.

3rd. Sphere correct and cylinder correct as to axis, but overcorrected as to strength. In this condition the first principal meridian remains at the point of reversal, but in the meridian in which, before the addition of a cylinder, we had a with-movement, we now have an against-movement, showing an overcorrection in the second principal meridian. It is now necessary to gradually reduce the strength of our cylinder while maintaining it at the same axis, until our against-band of light is at the point of reversal.

4th. Sphere correct and cylinder correct as to focus but off axis. If the cylinder is off axis in a clockwise direction, we find we have developed a with-band of light with its long axis at approximately 45°, to the opposite side of the proper axis and an against-band at right angles to the with-band. Whereas formerly we had a point of reversal in the first principal meridian, we now have two distinct bands of light, one with, and the other against, which makes us know that our cylinder is off axis. Now rotate the cylinder toward the with-band, in this case anticlockwise, until the with-band and the proper axis of the cylinder merge, and all movement of light stops. If we rotate too far we again have a with-band, again about 45° to the opposite side of the proper axis and an against-band at right angles to this. When we see this developing, we know that our cylinder has been rotated too far. Again we rotate it toward the with-

band. In other words, when the cylinder is off axis, always rotate toward the with-band until all motion ceases. Perhaps an example of this will serve to elucidate the phenomena which take place.

Suppose we have a compound hyperopic astigmatism corrected by a plus 1 sphere combined with a plus 1 cylinder, axis 90°. If our distance from the patient is one meter, we stop all motion in the first principal meridian with a plus 2 sphere, but there remains a with-band of light, its long axis vertical. In front of our plus 2 sphere we place a plus 1 cylinder, axis 75°, and find that we have a with-band of light at approximately 135°, and an against-band at approximately 45°. Now we rotate the cylinder toward the with-band, that is, toward 135°. If we rotate it to 105° we find that our with-band is switched to the opposite side of 90° and is around 45°, and the against-band is around 135°. Now we know we have gone too far, and we must again rotate our cylinder toward the with-band. We rotate toward this band until all motion stops, at which point we know that our axis is accurately determined.

5th. Sphere correct but cylinder undercorrected and off axis. We find the same phenomena appearing as in 4 with the exception that the with-band of light is less than 45° from the proper axis. Using the above example, instead of adding to our plus 2 sphere, a plus 1 cylinder, axis 75, we add a plus 0.50 cylinder. With the cylinder at this axis we have a with-band of light between 90° and 135° and an against-band at right angles to this. As in the above case, if we rotate the cylinder too far, to 105° for example, we develop a with-band between 45° and 90° and an against-band at right angles. We now determine our axis by rotating the cylinder toward the with-band, as in the above case, until the with-band merges with the proper axis and instead of an against-movement at right angles, we have all motion stopped. Of course we continue to have a with-band, axis vertical, and all that is now necessary is to increase the strength of our cylinder to the point of reversal of this meridian.

6th. Sphere correct but cylinder overcorrected and off axis. We now have a with-band of light with its long axis more than 45° to the opposite side of the proper axis and an against-band at right angles to this.

Going ahead with our same example, if we add to our plus 2 sphere a plus 1.50 cylinder, axis 75, we have a with-band of light between 135° and 180° and an against-band at right angles. We turn the axis toward the with-band and if we pass our proper axis and go to 105° we have a with-band develop on the opposite side of 90° between zero and 45° and an against-band at right angles to this. We now rotate toward the with-band until our shadow in the 180th meridian is at the point of reversal and we have only an against-motion in the vertical meridian. It now remains for us to reduce the strength of our cylinder until all motion stops in this meridian.

To check the accuracy of our correction we rotate the cylinder a few degrees (10 to 15) clockwise and find we have developed a with-band of light at approximately 45° to the opposite side of the proper axis and an against-band at right angles to this. Now rotate the cylinder anticlockwise a few degrees (10-15) from the proper axis, and we have again developed a with-band at approximately 45° on the other side of the proper axis and an against-band at right angles. At the same time we are checking the axis of the cylinder, we may also check the strength. If, when we have rotated the cylinder from its proper axis, the with-band appears close to the original axis (less than 45°) but on the opposite side, we know our cylinder is too weak. On the other hand, if the with-band appears more than 45° on the opposite side of the proper axis, we know the cylinder is too strong. For example, in the case cited above, our proper retinoscopic correction is a plus 2 sphere with a plus 1 cylinder, axis 90. If this correction is in the frame all motion is stopped, but if we rotate the cylinder to axis 75 a with-band appears at 135° and an against at 45°. Suppose the cylinders were under-corrected and off axis at 75, the with-band lies nearer

90°. If it is overcorrected, the with-band lies nearer 180°.

COMPOUND MYOPIC ASTIGMATISM

Without going into detail, suffice it to say that exactly the opposite findings are present in this condition.

1st. Sphere correct and cylinder correct as to focus and axis. All motion is now stopped.

2nd. Sphere correct and cylinder correct as to axis but undercorrected as to focus.

There is an against-band in the same axis as that found when only the first principal meridian is corrected. Point of reversal is maintained in the first principal meridian.

3rd. Sphere correct and cylinder correct as to axis, but overcorrected as to focus.

In this case also the first principal meridian remains at the point of reversal but we have a with-band instead of an against-band at the original axis.

4th. Sphere correct and cylinder correct as to focus but off axis.

As in No. 4 under Compound Hyperopic Astigmatism we have developed an against-band and a with-band. We now proceed toward the against-band in a manner likened unto the procedure toward the with-band in Hyperopic Astigmatism, that is, turn the axis of our minus cylinder toward the against-band.

5th. Sphere correct but cylinder undercorrected and off axis.

In this case we have an against-band present less than 45° to the opposite side of the true axis and a with-band at right angles.

6th. Sphere correct but cylinder overcorrected and off axis.

Here we have an against-band more than 45° to the opposite side of the proper axis.

If we exactly neutralize the spherocylindrical error in the eye with a combination of a sphere and cylinder placed in front of it, we are at the point of reversal of motion with our retinoscope. If our sphere is correct but cylinder undercorrected and at the proper axis, one meridian is at the point of reversal but the original band of light continues as before with the exception that the light is more brilliant and more rapid in its movement. If our sphere is correct but cylinder overcorrected and at the proper axis, one meridian is at the point of reversal but the original band of light is reversed. If the sphere is correct and the cylinder correct as to focus but off axis, in hyperopic astigmatism a with-band and an against-band are present, the with-band being at approximately 45° to the opposite side of the proper axis and an against-band at right angles to this; in myopic astigmatism, the against-band in this case acts in the same manner as the with-band in hyperopic astigmatism. If the sphere is correct but the cylinder undercorrected and off axis we have a with-band of light which lies to the opposite side of the proper axis and within a few degrees of it and, as usual, the against-band at right angles. In myopic astigmatism we have the same development of an against and a with-band with the against-band lying less than 45° to the opposite side of the proper axis. If the sphere is correct but the cylinder over-correct and off axis we have a with-band of light which lies to the opposite side of the proper axis but more than 45° away from it. In myopic astigmatism the against and with-bands appear, the against-band lying far from the proper axis and the with-band, as usual, at right angles.

The explanation of the development of a with and against-band when the cylinder is off axis lies in the fact that two cylinders whose axes are oblique are equal to another cross-cylinder whose axes are at right angles, consequently our retinoscopic shadows show that one meridian is overcorrected while the other is undercorrected.

The farther off axis we get with our cylinder, the more distinct the band becomes. Also if we are off axis we develop both a with and an against-motion, while if the axis is properly placed, we have either no motion or only that in the one meridian, due to the cylinder being under- or overcor-

rected. By this with- and against-motion we know we have overcorrected one meridian and undercorrected the other with the cylinder.

As a final check, if the addition of a plus .25 sphere produces one type of movement and if it is removed and a minus .25 produces movement in the opposite direction we may know that our retinoscopy is accurate.

All the mathematical formulas for the exact determination of the powers and axes created when two cylinders are placed at oblique axes, may be found in the second and revised edition of "General and Practical Optics" by Lionel Laurance. By these formulas we may prove just why our retinoscopic shadows are produced in the manner above stated.

MILK INJECTIONS IN OPHTHALMIC CASES.

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Recent literature of nonspecific protein reactions and therapy is briefly reviewed. The relation of therapeutic value to the general reaction produced is emphasized. This value seems best established with reference to acute inflammatory conditions of the anterior segment of the eye, particularly infections following perforating injuries in operations. An illustrative case and experiments comparing fresh milk with other protein sources are reported. Read before the Pacific Coast Oto-Ophthalmological Society, June, 1925.

The phenomena of nonspecific protein reactions were observed many years ago when, during the treatment of certain infections with socalled specific serums and vaccines, it was noted that nonrelated concurrent infections often were as favorably influenced as was the disease for which the serum or vaccine was supposed to be a specific. Little attention was given to these facts during the period of almost universal adherence to the theory of the absolute specificity of this form of treatment. Only within the past ten or fifteen years has any serious attempt been made to find an explanation for these therapeutic results.

In the field of ophthalmology during the past ten years a large amount of work has been done, both clinical and experimental, in an effort to determine the true status of nonspecific protein therapy. A great variety of therapeutic agents have been used;—serums, proteins, protein split products, enzymes, tissue extracts, vaccines, bacterial extracts, etc.; and the treatment has been applied in practically every known ophthalmic disease, with an almost equally heterogeneous total of results. Quite naturally some observers became overenthusiastic concerning the possibilities of this form of treatment, while many have been unduly skeptical. Only three years ago the writer observed that undoubted beneficial results were being regularly obtained with the injection of whole milk in the Vienna clinics, while the men who had tried this method of treatment in Paris, London, and in most instances in America, were reporting negative or indifferent effects. Apparently these wide variations in results were due to the lack of uniformity of the protein agent employed, of the method of administration, and in the selection of the cases to be treated. However, a large number of favorable results have been obtained, and it is now almost universally conceded that the systemic reaction produced by the injection of nonspecific proteins has considerable therapeutic value in the treatment of certain inflammatory ocular diseases.

The study of the nonspecific protein reaction presents numerous problems, and measurable progress has been made toward the solution of many of these questions. Chief among the problems involved are: (1) The most suitable type of protein agent; (2) The proper method of administration; (3) The selection of cases in which this form of therapy is indicated; (4) The way in which the therapeutic effect is produced.

The protein agents that have been most widely used in ophthalmology are; sterilized whole milk, antidiph-

theritic serum, vaccines, normal horse serum, cib-albumen, aolan, caseosan, yatren-casein and various albumoses, proteoses and peptones. It was early recognized that only those agents were effective therapeutically which were capable of producing a considerable general systemic reaction, and these observations of the early investigators have been borne out by the later work in this field. In the light of these facts it seems strange to find the manufacturers of certain protein preparations claiming superiority for their products because they do not produce this general reaction. Undoubtedly such agents would be very desirable if, at the same time, they produced equally satisfactory therapeutic results. But, as Petersen[1] points out, it is probable that the mechanism of recovery after injections of nonspecific proteins is very closely related to the degree of the negative phase, or the intensification of the disease process, which is manifested clinically by the reaction of the patient. This systemic reaction to protein injections is usually evidenced by a slight chill, a rise of temperature of two or three degrees, sweating, some nausea and nervous irritability, and leucocytosis.

The intramuscular injection of milk was introduced by Schmidt and Saxl about 1915. Milk was selected because it was readily available and because its chemical composition is fairly constant. During the past decade milk injection has been employed very extensively and has been proved an effective agent in eliciting the protein reaction. Bargy[2], after the use of this treatment in 3,000 eye cases, concluded that it is not a therapeutic panacea but of considerable value in the treatment of inflammatory and suppurative conditions of the anterior segment of the eye. Numerous other workers, as Riech[3], Mans[4], and Marin Amat[5], have recorded similar results. In the Vienna clinics undoubted beneficial results were obtained in the treatment of suitable cases with milk injections. Lindner, in treating gonococcic blennorrhea, found that frequently no gonococci could be demonstrated in the conjunctiva thirty-six to forty-eight hours after the beginning of milk injections. The milk was boiled three to four minutes and ten c. c. was injected intragluteally as the dose for adults. This was usually repeated on the second and fourth days, or on the second, third and fifth days, depending upon the urgency of the case and the severity of the systemic reaction produced.

Numerous observers have noted, however, that the reaction to milk injections often varies considerably in different localities and in the same locality with milk from different sources. This observation called attention to the fact that milk is subject to considerable variations as to its properties of producing the protein reaction, and lead to an attempt to identify the most efficacious elements contained in milk. Bessan, DeCastello, and E. F. Mueller concluded that the reaction is due wholly to the bacteria contained in the milk; while Uddgrenn believes that the reaction is due to bacterial derivatives, or protein split products. Barkan and Nelson[6] have shown by animal experimentation that the rise in temperature following milk injections is due very largely, if not entirely, to the presence of bacterial bodies and the soluble products of bacterial metabolism.

Antidiphtheritic serum has been used extensively to elicit the protein reaction in the treatment of eye diseases. Ben Witt Key[7] has reported good results with intramuscular injections of this agent in numerous cases of serpiginous ulcer and hypopyon keratitis. He believes it is preferable to milk, because the dosage can be more accurately controlled and its anaphylactic properties are better understood. He injects from 1,000 to 5,000 units and repeats the dose every second day, as indicated. He believes that the antitoxin globulins are more potent than the proteins of the horse serum, and therefore advocates the concentration of these globulins so as to eliminate much of the danger of serum sickness.

Trieberstein[8] reported beneficial results with yatren-casein in certain chronic inflammations, but found that milk is more effective in the treatment

of acute, severe, inflammatory conditions. Barkan and Nelson[6] believe the protein split products, as albumoses, proteoses, and peptones, to be more effective than the native proteins. Mans[4] produced marked improvement in scrofulous eye conditions with milk injections, while aolan and caseosan were found to have no therapeutic influence on these cases.

Foreign proteins have been administered orally, intravenously, subcuticularly, and intramuscularly. The oral administration can be dismissed without serious consideration. The intravenous injection of proteins has not received general favor, because of the attendant dangers of the technic and the fact that the shock of the reaction is likely to be acute. The subcuticular injection is more difficult to carry out and has not been shown to be more effective than other methods. Most workers have preferred the intramuscular route for protein injections. Large quantities of the protein agent can be readily administered by this method with comparative safety and with little or no inconvenience to the patient, other than a slight soreness at the point of injection, lasting a few hours. Some disagreeable effects have been reported following intramuscular injections; for example, abscesses at the site of injection and severe shock caused by the needle entering a blood vessel. These accidents, however, are usually due to faulty technic.

Non specific protein therapy has been tried in practically every ophthalmic disease, but experience has shown that it is most effective in acute and subacute inflammatory conditions of the anterior segment of the eyeball, and in gonococcic infections of the conjunctiva. Various workers have reported good results in acute and subacute idiopathic iritis and iridocyclitis; in serpiginous ulcer and hypopyon keratitis; in scrofulous diseases of the cornea and conjunctiva; and in infections of the anterior segment of the eyeball from perforating injuries and operative wounds. Beneficial results have also been noted in some cases of sympathetic ophthalmia, optic neuritis, keratomalacia, and in the relief of pain in panophthalmitis. The type of infection which seems most susceptible to protein therapy is that due to staphylococcus pyogenes aureus and pneumococcus infections of the refractive media. Like all our therapeutic measures, protein therapy is not well borne by all patients. Hann[9] points out that heart and respiratory disturbances and anaphylactic shock sometimes occur following milk injections. He states that scrofulous children sometimes have an increase of temperature for several weeks as a result of milk therapy, and that in status lymphaticus and asthenia the reaction may prove fatal. Key[7] warns against the use of antidiphtheritic serum in cases with a history of previous severe anaphylactic reactions, a previous attack of diphtheria, cases of status lymphaticus, and persons having asthma or hay-fever like attacks in a horse environment.

The modus operandi of this nonspecific protein reaction has received a great deal of study by the foremost workers in this field. It has been shown that the focal reaction, or therapeutic effect, of this treatment is dependent upon the general systemic reaction of the patient, but the way in which this effect is brought about is still an open question. Numerous theories have been advanced to explain the clinical phenomena of the protein reaction. Reich[3] concludes that the rise in temperature increases the biologic activity of the body cells and in that way produces the therapeutic effect. Marin Amat[5] believes that the proteins act thru an influence on the spinal sympathetic nervous system and by stimulating the production of proteolytic ferments. Fulton[10] believes that the therapeutic effect is due to a stimulation of the involuntary nervous system and bone marrow, and also to an increased permeability of the vascular walls, resulting in an increased leucocytic activity in the affected area. The systemic reaction, manifested by slight chill, moderate rise of temperature, sweating, nausea, nervous irritability, increased glandular activity, increased permeability of the capillaries, lymphogogue reaction

and certain alterations in the blood, such as increased coagulability, increased antiferment, and alteration in the antibody titer of the serum of the patient, indicates a true tissue stimulation and activation; and Key believes that the therapeutic effect of protein injections is produced by this alteration in the reactivity of the whole organism, rather than by a direct influence upon the pathologic process. It is very probable that the final solution of this problem will have to wait on further developments in the field of the chemistry of the colloids.

The rather limited number of cases studied by the writer have been treated almost entirely by injections of whole milk, following the technic used in the Vienna clinics. This series consists of ten cases of infection of the anterior segment of the eyeball following perforating injuries; six cases of acute and subacute idiopathic iritis and iridocyclitis; one case of serpiginous ulcer with hypopyon; two cases of iritis following operations for cataract. All cases showed some benefit following the milk injections, and no serious reactions occurred in any of the patients. The usual systemic reaction was a slight chill, slight nausea, and a rise of temperature of from two to four degrees, which reached its maximum in six to eight hours and subsided in from eighteen to twenty-four hours. One patient, however, a case of serpiginous ulcer with hypopyon, experienced an accentuation of the symptoms of chill and nausea, but the rise in temperature was never more than one degree. The therapeutic effect was satisfactory, the ulcer progressing no further after the first injection of milk. I have found no explanation for the absence of the usual rise of temperature. Cases of infection of the anterior segment following perforating wounds are probably the most favorable for demonstrating the efficacy of protein therapy. The following is an illustration of the usual favorable therapeutic reaction in these cases.

Male, age 20, struck on left eye by a slug from an air pressure drill. Given local treatment at the place of injury, where it was considered that the foreign body was not retained inside the eyeball. The patient was seen three days after injury, at which time he was complaining of severe pains in and about the eyeball. The eye was markedly injected; cornea extensively infiltrated, the infiltration extending from a 4 millimeter perforation near the limbus; extensive laceration of the iris; aqueous very cloudy and considerable hypopyon. A disc of steel 4 millimeters in diameter and 1 millimeter in thickness was removed by means of the giant magnet, and ten c. c. of milk was given intramuscularly. The following day the infiltration and inflammation of the eye showed marked improvement. Two subsequent injections of milk were administered, on the third and fifth days. The eye recovered completely from the effects of the infection. The usual application of atropin and hot fomentations was not dispensed with. I believe it is considered, however, that these latter measures have not been of very much help in the treatment of this type of case.

Antidiphtheritic serum was administered to an adult patient with recurrent idiopathic iridocyclitis, but the case is too recent to form an opinion of the final therapeutic results. 3,000 units were injected intramuscularly every second day for three doses. Little or no systematic reaction was produced by the first two injections. The third injection, however, produced a mild anaphylactic reaction and the patient was indisposed for several days following. There was also a considerable local reaction about the site of the injection. The inflammatory condition of the eye showed a considerable exacerbation following the third injection, but this gradually subsided at the same time that the general condition of the patient improved.

An attempt was also made to compare the effect of whole milk and "aolan" in the same patient. The results were as follows (table 1):

TABLE I.

Protein agent	Maximum temperature
1st day 10 c.c. fresh milk.....	102.0°
2nd day 10 c.c. aolan	99.2°
4th day 10 c.c. fresh milk	101.8°

On the basis of the fact that the therapeutic effect of protein injections is dependent upon the general systemic reaction, and, in general, the temperature rise has been shown to be a fairly reliable indicator of the systemic reaction, we must conclude that aolan is much less effective than fresh whole milk.

It was noted from the beginning of the use of milk injections that milk from different sources frequently produced different temperature reactions in the same patient. In an attempt to determine the reason for these variations, certified milk and ordinary pasteurized milk were given to the same patient on alternate days. It was then noted that the rise of temperature following an injection of certified milk was often greater than that after an injection of pasteurized milk. A number of samples of milk were then collected and bacterial counts made, when it was found that the number of bacteria in the certified milk was often higher than in the pasteurized milk. The samples were collected in sterile tubes from a quantity of sterilized milk, a portion of the same quantity then being given to the patient by intramuscular injection. The temperature reaction following each injection and the bacterial count of each sample were recorded. Comparison of these figures shows that, altho the amount of rise in temperature corresponds in a general way to the number of bacteria in the milk injected, slight variations in the bacterial count do not necessarily produce corresponding variations in the temperature reaction (tables II and III).

TABLE II.

Protein agent	Bact. Count	Max. Tem.
1st day 8 c.c. pasteurized milk	1,200,000	103.2°
2nd day 8 c.c. certified milk	800,000	100.8°
4th day 8 c.c. pasteurized milk	560,000	100.6°

TABLE III.

Protein agent	Bact. Count	Max. Tem.
1st day 10 c.c. pasteurized milk	44,000	100.2°
2nd day 10 c.c. certified milk	64,000	99.4°
4th day 10 c.c. pasteurized milk	78,000	100.6°

The results from this small series of cases only serve to further emphasize the facts that have been previously brought out; first, that the systemic reaction from milk injections is a valuable therapeutic aid in certain ocular diseases; second, that bacteria and the products of bacterial activity are more effective in producing this reaction than are other forms of protein; third, that the numerous phases and variations of the reaction of the patient to nonspecific protein therapy cannot all be explained in the light of our present knowledge of the subject. Perhaps shortly we shall have more definite knowledge in this field as more careful investigations are made, particularly with regard to the problem of the most suitable type of protein agent and the most effective dosage.

In this work the writer is indebted to Mr. H. W. Chamberlain for very careful and painstaking work in making the bacterial counts.

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OSTEOMA OF THE ORBIT

JAMES E. LEBENSOHN, M. D.

CHICAGO, ILLINOIS.

This paper briefly discusses the rarity and important features of such tumors. It reports a case in which the osteoma was removed and recovery was complete. Presented before the Chicago Ophthalmological Society, April 20, 1925. See v. 8, p. 969.

Orbital osteomata are very rare. Andrews,[1] in 1887, found that of nearly one-half million eye cases seen in New York clinics in the preceding sixty-five years, there had been only eight patients with orbital osteomata. From the first reported case in 1506 (cited by Bedell[2]) to those included in the present writing, 226 cases are on record to date.

Fig. 1. Appearance of patient before development of symptoms.

Fig. 2. Patient's appearance just before operation Note position of left eye.

Orbital osteomata generally arise from the neighboring sinuses, rarely from the orbital periosteum. The greater number of cases have occurred in young people, suggesting that aberrant development of the sinuses is responsible. About 80 per cent of the patients have been under 30 years.

These osteomata are very slow growing. In the days before surgical intervention, at autopsies orbital exostoses were found that sometimes reached the size of a large potato—up to 4½ inches in diameter and weighing up to fourteen ounces. The growth, tho histologically benign, is clinically malignant, due to the pressure exerted on the orbital and cranial cavities. In unoperated cases, rupture of the globe, extrusion of the mass, optic neuritis, optic atrophy, and apoplexy are among the sequelae reported. Sinusitis frequently occurs; the closure of the nasofrontal canal probably causes stagnation of the secretion, and subsequent decomposition. In the presence of this complication, meningitis, brain abscess, and orbital infection have resulted. In osteomata of the frontal sinus, the mortality in the unoperated cases is 48% (according to Birch-Hirschfeld); and those arising from the ethmoid and sphenoid are more fatal. Excision is hence imperative, and the prognosis of early operation is favorable. Since 1885, the operative mortality has been 3 per cent.[3]

In osteomata of the frontal sinus, the largest portion of the growth is in the sinus, and only a small part projects into the orbit. The growth is irregular in form, and adherent to the sinus by a small or large pedicle. The tumor is generally composed of an ivory like shell, which preponderates, and a spongy interior. The osteoma distends the walls of the sinus, then perforates, but the bone it pierces re-

mains unfused with it. The perforation takes place generally outward thru the anterior plate of the frontal bone, and thru the roof of the orbit into the orbital cavity. Perforation may occur. however, thru the septum between the frontal sinuses, or into the cranial cavity.

Fig. 3. Radiogram showing position of osteoma taken from front.

Fig. 4. Radiogram showing osteoma lateral view.

Even with large tumors of the frontal sinus there may be no symptoms, except for displacement of the eye and facial disfigurement. The dislocation of the globe is generally forward, outward, and downward.

The following case report is submitted (Dr. G. F. Suker operated):

Case 1. The patient was a white male, age 24, farmer by occupation, and well developed physically. He was seen at the U. S. Veterans' Hospital, Maywood, Ill., June 1, 1924. He stated that in the latter part of 1922, the left eye began to trouble him. He became affected with diplopia, headache and dizziness, which have continued since.

By inspection one notes that the left eye is at a lower level than the right. (Note photograph.) The lower lid is tense, due to the exophthalmos present. A prominence is present at the inner corner of the upper lid. At this point (the upper inner margin of the left orbit), there is palpable a hard bony growth that extends for one-half inch outward and downward.

The vision was R. E.=20/20: L. E.=20/25. The correction was R. E. +50 S.=20/20; L. E.—25 C. X. 180 =20/20. The fundi were normal. Diplopia was vertical, increased on looking to the right, and particularly troublesome for reading, tho for distance the patient was not much disturbed. The left cataphoria measured 3-8 prism diopters according to the direction of gaze. With 4 prism diopters base up over the left eye, the patient read fairly comfortably.

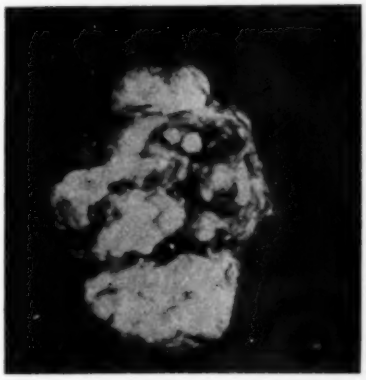

Fig. 5. Osteoma of orbit after removal.

The X-ray showed a large tumor of the left frontal sinus which had perforated into the orbit. (Note photographs.)

The patient was operated June 5 under ether anesthesia. An incision was made along the inner third of the superciliary arch and the left frontal sinus entered. The osteoma was broken in two parts by chisel and bone

forceps. The orbital portion was first delivered. The remaining portion was easily detached from its slender pedicle. A certain amount of mucoid secretion was present, and was swabbed out. The right frontal sinus was explored but contained only mucoid secretion. The wound was closed without drainage. Immediately after the operation marked edema of the lids of both eyes developed, but passed away after several days of iced applications. On June 14 the patient was up, and on June 28 was discharged as entirely recovered.

The osteoma was about 3.5 cm. long and 3 cm. wide; the weight was 14.7 gm.; volume 8.9 cc.; and the specific gravity, 1.66.

25 E. Washington Street.

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NOTES, CASES, INSTRUMENTS

A PRELIMINARY REPORT ON THE RETINAL VESSEL SCOTOMA.

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BROOKLYN, N. Y.

Few of us, as has so often been said, take full advantage of visual field studies. There are those who are skeptical largely because they have not taken the trouble to work out the technic of the procedure. The writer wishes to add what he feels is not only a new paragraph to this valuable phase of our work but also to draw attention to that most wonderful of all instruments of its kind,—the stereocampimeter. Dr. Ralph Lloyd, thru whose efforts it was developed, and whose slate made it possible, cannot be too strongly commended for making more accurate the least accurate of instruments in this the most accurate branch of medicine.

The merest reference is made in the literature to the plotting of the retinal vessels. Dr. Marlow, in working out his averages for the normal blind spot, goes into the most detail and shows the most elaborate charts.

The writer was astonished when he discovered a peculiar star shaped blind spot. In following out this clue it was discovered that the vessels were being mapped without the least difficulty. The test could be interrupted and resumed, yet the scotoma fell exactly as before.

These plottings correspond exactly with the vessels as seen by the ophthalmoscope, arteries and veins being mapped with almost equal facility. Almost every vessel could be so mapped, to the extremes of the slate, using the smallest object provided with the instrument (1.5 mm. in diameter), but smaller ones gave even more satisfactory findings. The distance from eye to fixation point was 190 mm. Where muscle balance was perfect binocular fixation was used. If there was any doubt monocular fixation was employed. There seems to be no difficulty in following the nasal inferior and superior vessels to their third and fourth bifurcations, the temporal divisions fading as they approach the center of fixation, as would be expected. So numerous do the branchings become when far out in the periphery, that there is a continual flickering of the object, and it makes one wonder if some of the peripheral functions of the retina are not ascribable to this overlaying netlike scotoma, perhaps giving rise to a keener motion, —sensitivity—thru the production of changing contrasts. (A satisfactory explanation of which has not been previously given.)

There are other interesting points which the writer hopes to discuss at a future time when more thoro studies have been made.

As regards the technic, the principles of perimetry are not diverged from.

The mapping is best done from seeing to scotomatous area and always at right angles to the supposed course of the vessel. It is not necessary to have a remarkably intelligent patient and the scotoma, being absolute, gives very heavier plotting of this scotoma,—as normal nystagmoid movements of the fixing eye—patients' and examiners' reaction time, mechanical difficulties in plotting and connecting the dots.

It is proposed to consider the rela-

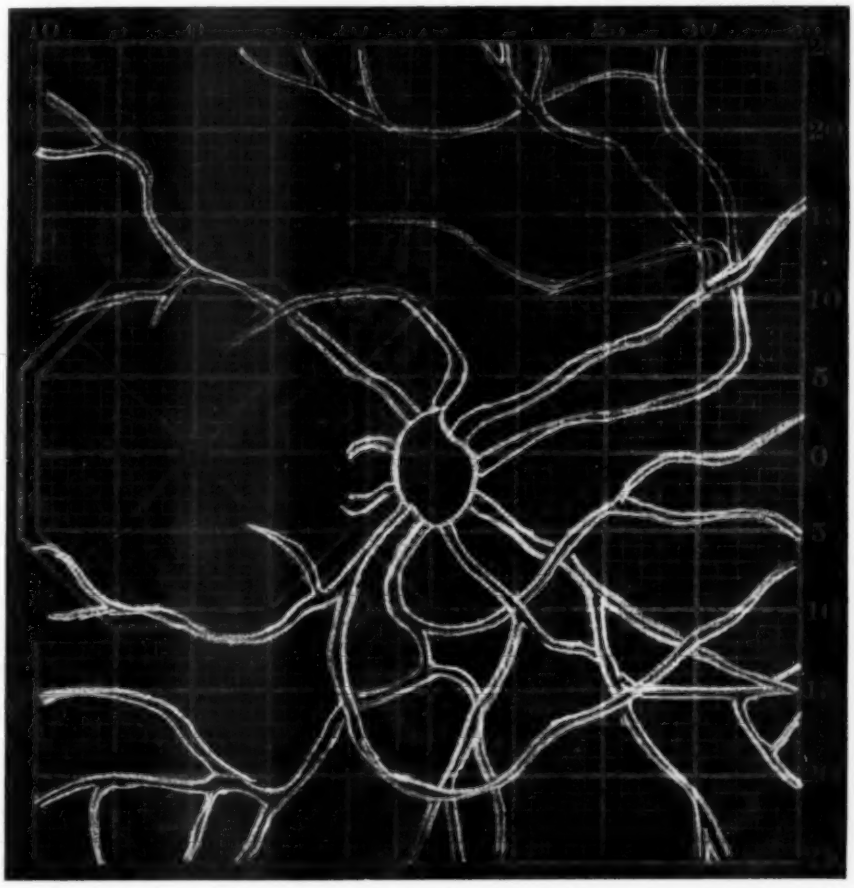

Fig. 1.—Typical retinal vessel scotoma. The lines have been heavily drawn for purposes of reproduction. (Evans).

definite response. Signalling by tapping is preferable.

The studies have been made on twenty eyes of young adults with no refractive defects or with low corrected error. A special standardizable daylight illumination was used of 15 foot candle power strength. The object was a white disc 1.5 mm. in diameter (cases in which a smaller object was used are not included with these). The mapping was done directly on the black charts provided with the instrument to save the necessity of transferring the records. It must be realized that many factors give rise to a tion of the vessel scotoma in pathologic states after the normal variations are satisfactorily understood. The plotting of this scotoma is so easily done that many contributions should be forthcoming thru clinical study.

23 *Schermerhorn St.*

OIL INJECTIONS IN THE TREATMENT OF LACRIMAL DUCT STENOSIS.

G. M. McBEAN, M. D.

CHICAGO, ILLINOIS

Many of these cases have been treated over long periods of time by

passing probes thru a more or less obstructed lacrimal duct into the nose In dilating these strictures the mucous membrane is traumatized and frequently bleeds. After each treatment these excoriated fissured surfaces remain in contact and fresh adhesions develop which in turn produce more stenosis. In order to keep these abraded membranes apart after passing lacrimal probes, some nonirritating foreign substance should be placed in the duct until healing takes place.

For several years it has been my custom to fill the Anel lacrimal syringe with albolene oil before placing the cannula on the syringe. Then, by injecting the oil as far down the duct as possible some of it will pass through into the nose. Enough oil remains in the tear sac and duct to prevent fresh adhesions forming.

This simple method has enabled me in a short time to render permanently patent three cases of stricture with chronic dacryocystitis which had come to me after long courses of treatment by probing.

I have not found it necessary to use probes larger than Bowman 3 or 4 if followed by the oil injection.

Considerable pressure is necessary to force the oil thru the narrow lacrimal cannula, so special care must be observed not to make a false passage about the duct, for the sense of resistance to the piston will not be a guide.

Probably any other nonirritating oil will serve as well as albolene. Heavier oils, however, will not pass thru an ordinary cannula.

22 E. Washington St.

RED FREE LIGHT AND FLUORESCEIN IN EXAMINATION OF CORNEA AND CONJUNCTIVA.

WILLIAM M. BANE, M. D.

DENVER, COLORADO.

The literature on the use of red free light in ophthalmology contains no reference, that I have been able to find, to its use in the examination of the cornea and conjunctiva. It is of especial value in the examination of the anterior segment when it is desired to demonstrate the loss of the protective epithelium.

In the past I have used concentrated daylight in preference to artificial light for this purpose, but have recently observed that red free light is much better, and delineates with great accuracy the slightest denuded area after fluorescein staining. The color is greatly intensified with this light, which shows up conjunctival as clearly as corneal denudation.

The fluorescein is used in 1% solution, a very small quantity being sufficient, since excess of the stain interferes with the examination. The Black-Shields ophthalmic lamp is well adapted for use in this examination, as it is equipped with a very efficient red free filter.

330 Metropolitan Bldg.

NEOPLASM OF THE PITUITARY BODY.

W. F. BONNER, M. D.

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This case presented the following unusual characteristics: 1. Normal field vision in the right eye, and an atypical field in the left eye resembling optic atrophy, when first seen, changing to bitemporal hemianopsia. 2. Normal physical examination with no symptoms of hyper- or hypopituitarism.

The patient first reported for a refraction February 2, 1924. The right eye had a vision of 20/50 improved by refraction to 20/20 partly. The left eye had 20/200 when looking out of the temporal half. Ophthalmoscopic examination of right eye showed media clear, disc oval axis 90°, blood vessels normal, macula and periphery negative. The disc of the left eye was pale on the temporal side. The field of vision in the right eye was normal. The field of vision in the left eye was very constricted, resembling optic atrophy. A search was made for the cause of this. A blood Wasserman was done, which was negative.. The patient objected to further search.

The patient reported again on the fourth of November, 1924, complain-

ing that the vision was much poorer in the left eye and not so good in the right eye. Vision was 3/45 in the right eye and fingers at 2 feet in the left eye. The field of vision in the right eye had shrunken to the nasal

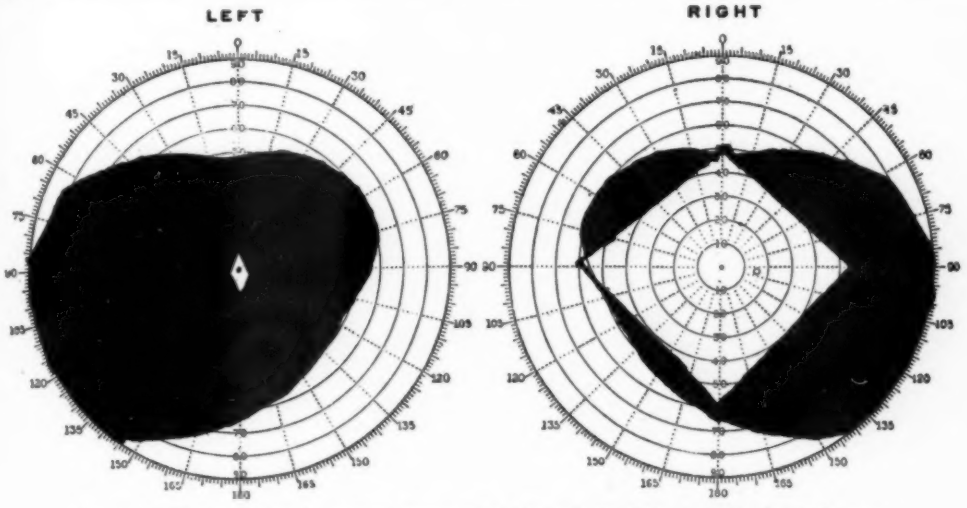

Fig. 1. Fields of vision in case of tumor of pituitary body, Feb. 2, 1924, Bonner's case.

half and in the left eye to the upper nasal quadrant. Ophthalmoscopic examination showed pallor of the temporal half of the right disc and total pallor of the left disc. A spinal fluid examination showed a negative Wasserman, a colloidal gold curve of 2211100000, which was diagnosed as faintly luetic, but was considered negligible in the absence of a positive Wasserman. At the suggestion of Dr Griscom an X-ray was taken, which showed complete absorption of the sella turcica. A physical examination was made revealing normal heart lungs and blood pressure. At the suggestion of the internist, a basal metabolic rating was taken, which was a plus 3%.

A consultation was arranged for with Dr. Charles H. Frazier, who concurred in the diagnosis of a neoplasm of the pituitary body. A transsphenoidal operation was done by Dr. Fra-

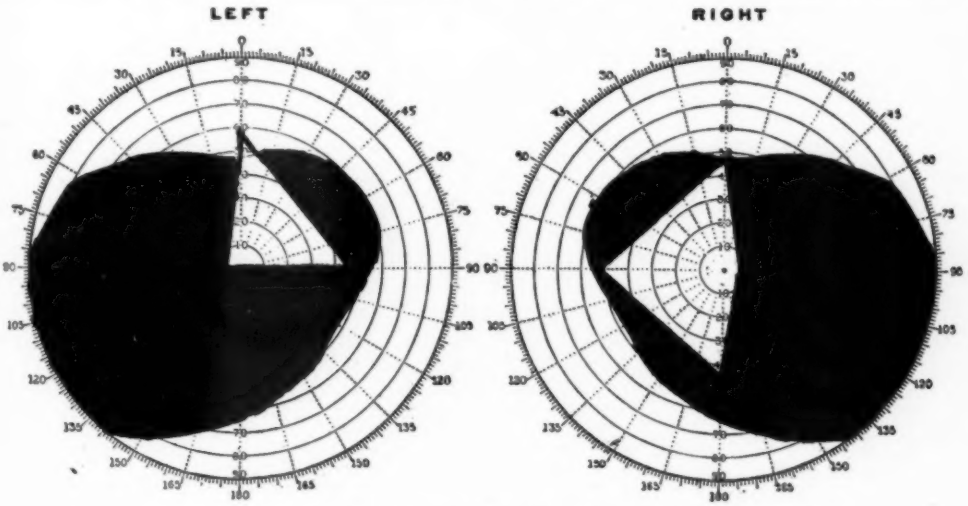

Fig. 2. Fields of vision in Bonner's case Nov. 4, 1924.

zier in the early part of December. Dr. Allen J. Smith diagnosed the tissue as an endothelioma of the pituitary body.

The last examination of the patient, March 16, 1925, showed an improvement in the vision of the right eye to

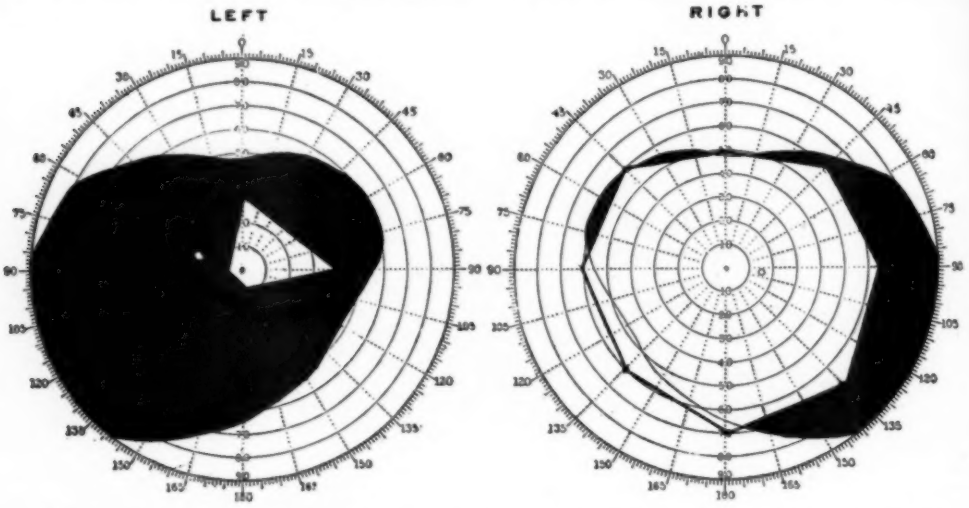

Fig. 3. Fields of vision in Bonner's case March 16, 1925, four months after removal of endothelioma.

6/25 and a field of vision that was practically normal. The left eye had not changed.

Summary. 1. When first seen the field of vision was normal in the right eye and atypical in the left eye, later changing to a bitemporal hemianopsia.

2. Normal physical examination.

3. X-ray showed absorption of sella turcica.

4. Diagnosis of neoplasm of pituitary body by Dr. Charles H. Frazier, who did a transsphenoidal operation.

5. Diagnosis of the section as endothelioma by Dr. Allen J. Smith.

6. Improvement of vision and field in right eye, none in left eye.

224 Delaware Trust Bldg.

A GENERAL UTILITY OPHTHALMIC LAMP.

JAMES M. SHIELDS, M. D.

DENVER, COLORADO.

The lamp I am presenting is the result of the development of an idea originally suggested to me by Dr. Melville Black's method of oblique illumination. He had placed an automobile spot light lamp in a skiascopy chimney; and in front of the aperture in the chimney had attached a plus 20 D. lens, thus producing parallel rays. For concentration of this light upon a given spot he had employed a condensing lens held in the hand in the usual manner. The evident usefulness of this simple arrangement suggested to me the possibility of the development of

Fig. 1. Shields' Ophthalmic Lamp showing details of lamp and arrangement of lenses.

a general utility ophthalmic lamp which might be adaptable to a variety of uses in the hands of the ophthalmologist. After considerable experiment I have succeeded in producing a lamp which I find highly satisfactory in my

own practice and I am submitting it for your approval. I use the lamp for the following purposes:

1. Oblique illumination, either with white or with red free light.

2. Ophthalmoscopy, using either white or red free light.

Fig. 2. Ophthalmic Lamp mounted on adjustable stand.

3. Retinoscopy, either with the ordinary illumination or with red free light, in patients showing photophobia.

4. The projection of histologic eye sections.

5. As an operating light.

The lamp itself consists of a ventilated hood so designed with interior baffling and asbestos sheathing as to give perfect ventilation to the globe without light leakage, thus reducing the heating of the hood to the minimum and preventing condensation of moisture on the lens, with resultant fogging. Attached to the hood is a holder designed to take the ordinary plus 20 D. trial case lens which, at this distance produces parallel rays. Anterior to this holder is a specially devised double holder, for the purpose of receiving the red ray filter when in use and also accommodating the microscopic slide when it is desired to use the lamp as a projector. It has, in addition, an attachment with 2 mm. aperture which can be swung into place for use in centric retinoscopy. The front holder is also designed to accommodate the ordinary trial case lens. The lamp is readily adjustable on its stand to suit any position of the patient, or it can be mounted on a handle and used as a hand lamp. The transformer has been placed in the base of the stand where it is not in the way and is out of sight. These features can be readily noted on the accompanying illustrations.

For oblique illumination, with a plus 20 D. lens in the first holder producing parallel rays, the addition of a plus 20 or a plus 10 D. lens in the anterior holder produces a steady, sharp point of focus very useful in the removal of foreign bodies from the cornea and showing beautifully pathologic changes in the anterior segment. With dilated pupil, lens changes may be readily seen. By inserting the red ray filter, increased vascularity in any part of the anterior segment is brought out in a very striking manner. The choice of lenses for the anterior holder in oblique illumination is practically unlimited as a great variety is available in the trial case and the choice is dependent only upon the focal distance required.

For ophthalmoscopic examination of small areas of the eyeground, the lamp is ideal, giving a source of light which is intense and which can be made red free by the insertion of the filter.

In retinoscopic examinations, I make use of centric retinoscopy as suggested by Dr. Edward Jackson; using the 3 mm. aperture attached to the anterior holder for this purpose. The lamp is equally adaptable to ordinary retinoscopy, however, using preferably a plus 5 D. lens in the anterior holder. With some photophobic patients I find the red free light a great convenience for retinoscopy.

For projection of histologic eye sections any degree of magnification may be secured, from about 4 X to about 70 X. With this range one may demon-

strate very clearly the relationship of different parts of histologic sections in a manner not possible with the naked eye or with the microscope. The latter, even with low power, includes too small an area in its field for this purpose.

When using the lamp as an operating light, a plus 10 D. lens will be found more practical in the anterior holder, altho any selection may be used at the discretion of the operator. For this purpose the lamp is especially satisfactory, giving an even, brilliant spot at any reasonable distance, in any position and of practically any desired size.

The particular features of the lamp that I hope will appeal to you are its extreme adaptability to practically any procedure in our routine work, its adjustability, the red free light feature, the very brilliant, clear, steady light produced, its simplicity and the fact that every oculist has in his equipment a full complement of lenses for use in the lamp for every conceivable purpose.

Metropolitan Bldg.

SOCIETY PROCEEDINGS

COLORADO OPHTHALMOLOGICAL SOCIETY.

OCTOBER 10, 1925.

DR. E. R. NEEPER, Presiding.

Dendritic Keratitis.

J. A. PATTERSON, Colorado Springs, showed a boy aged eight years whose left eye had a scar from an attack of dendritic keratitis about nine months previously. There had been moderate redness and tearing, no complaint of discomfort, and a delicate branching, scratch like line on the cornea which had progressed for a while. The condition had followed a cold. A history of chicken pox about six weeks before the onset of the cold was subsequently obtained.

Discussion. DR. W. C. FINNOFF had found the sensibility of the affected eye to be subnormal, while that of the other eye was normal. This confirmed the diagnosis of dendritic keratitis.

DR. EDWARD JACKSON had occasionally seen a similar corneal condition, arising several weeks after the healing of the pocks, in small pox. He did not think much could be done now.

DR. W. H. CRISP thought the chapter was practically closed. He referred to recent work which had been done as to the relationship between chicken pox and herpes, and suggested the close similarity between dendritic keratitis and herpes.

DR. FINNOFF thought that the eye was not entirely out of danger because of the anesthetic condition of the cornea.

Iritis from Dental Infection.

DR. E. M. MARBOURG presented a case of recurrent iritis apparently due to dental infection. During an attack of iritis the patient had had eight teeth extracted by a dentist at one time and had thereupon had a profuse hemorrhage into the anterior chamber of the affected eye and also a hemorrhage into the vitreous. The patient was said to have bled three pints of blood after extraction of the teeth.

Discussion. DR. J. A. PATTERSON said the patient must have been a hemophiliac. (Dr. Marbourg replied that this was the case.) He wished an opinion on the effect of inverted teeth, having seen a patient who had a deeply inverted tooth which had been partly extracted. He wanted to know if the remaining piece could be a factor in recurring attacks of iritis.

DR. F. E. WALLACE had listened to a talk by a noted dentist in which it was stated that inverted teeth could be a factor in such conditions.

DR. W. A. SEDWICK thought that so large a number of teeth should not all be removed at one time in this sort of case.

DR. W. C. BANE noted that this patient got the benefit of bleeding, and local depletion is one of the best things in iritis. He had recently seen a case in which two intravenous injections of sodium salicylat brought about very rapid subsidence of an iritis.

DR. J. M. SHIELDS referred to a case in which Neisser infection was responsible for an iritis, and the condition cleared up after treatment of the prostate.

Lens Dislocation from Rock Thrown by Tire.

DR. E. M. MARBOURG showed a case of ocular injury from a rock which had been thrown by a balloon tire on a car which passed the car in which the patient was riding. The lens was dislocated inward and upward, there was paralysis of the ciliary muscle and the field of vision presented a central scotoma.

Discussion. DR. W. C. FINNOFF mentioned a case reported several years previously in which rupture of the choroid had been caused by a rock thrown by an automobile tire.

DR. EDWARD JACKSON suggested that the dislocation might get worse and referred to the risk of subsequent glaucoma.

Scleral Rupture.

DR. V. H. BROBECK (by invitation) presented a man aged sixty-six years whose right eye had been injured by a hammer dropped by another workman ten feet above him. During the next five days, and before seeing an oculist, a mass was said to have formed, which ruptured a week after the injury, and about twelve hours before the patient was first seen by Dr. Brobeck. It was thought that possibly the mass had been a uveal hernia. At examination a stellate wound in the sclera was seen four millimeters to the temporal side of the limbus. In the center of the wound was a pigmented mass, probably uveal in character. The eyeball was soft, the iris tremulous, the pupil irregularly dilated, the lens clear, but the fundus obscure. Five weeks after the injury a small detachment of the iris at six o'clock could be seen by transillumination. Vision was gradually improving but was still very poor.

Discussion. DR. EDWARD JACKSON did not think that the patient was safe from sympathetic ophthalmia, altho the danger was probably very slight. His impression was that there was not so much danger of sympathetic ophthalmia at this age as in a very young person.

Keratoconus.

DR. V. H. BROBECK (by invitation) presented a case of keratoconus in a woman of forty-four years. She had worked as a seamstress for ten years until the vision had become so poor as to make work impossible. There was manifest thyroid enlargement, altho the patient had noticed very little change in the past five years. The vision of the right eye was counting fingers at six feet, corrected to 20/100, left eye counting fingers at two feet, unimproved. The right cornea had a faint central nebula, the left a more distinct central scar.

Discussion. DR. W. A. SEDWICK asked what association there might be between the ocular condition and disturbance of the ductless glands.

DR. EDWARD JACKSON said that in his experience every case of conical cornea had a history of previous ill health. In one case the remaining eye had become distinctly better after gastroenterostomy. In another case the general and ocular condition had become much better after operations on the thyroid.

DR. E. R. NEEPER said that in his experience there had been digestive disturbance in every case.

Dacryocystitis from Penetrating Injury.

DR. E. R. NEEPER showed a girl aged thirteen years, who in 1919 had been injured by the tooth of a manure spreader which had penetrated at the inner canthus of the left eye and had passed downwards into the mouth. The palpebral aperture had become lessened by cicatricial contraction of the skin at the inner canthus, so that the lashes swept the eyeball. There had been recurring attacks of dacryocystitis, usually rupturing externally. X-ray study showed only very slight abnormality. What operative procedure was advisable?

Discussion. DR. WM. H. CRISP sug-

gested a plastic operation to extend the skin area followed by treatment of the sac and perhaps later some modification of the Toti operation.

Dr. W. C. Finnoff suggested that during the war the experience had been that extirpation of the sac had to be performed first; and proposed that this should be the first operation, before any plastic surgery was attempted.

Metal Embedded in Cornea.

Dr. E. R. Neeper presented a man aged fifty-one years whose right cornea had been injured in May, 1924, by a particle of flying metal. Several attempts had been made at removal of a foreign body which was apparently embedded in the cornea. The patient had come to Dr. Neeper on October 6, 1925, with a history of epiphora, a sensation of a foreign body, and enough pain to keep him awake at night much of the time. The vision of the affected eye was 20/60. The cornea did not pain over the apparent foreign body. There was a small central area of infiltration with a definite reddish tinge and an outer zone of infiltration of the ordinary grayish color. Was there actually a foreign body in the cornea and should a further effort be made to remove it? What might the corneal microscope reveal in this case?

Dr. W. C. Bane thought there was a foreign body, and that an attempt should be made to remove it by getting behind it.

Dr. W. A. Sedwick suggested that the sideroscope might furnish information.

Dr. W. C. Finnoff thought that the corneal microscope might be of some value in determining whether there was any siderosis of the iris or any change in the lens. He felt that the foreign body was deep in the cornea.

Dr. Wm. Crisp suggested that the foreign body might be exposed by very sharp dissection of the cone of central infiltration.

Wm. H. Crisp,
Secretary.

MINNESOTA ACADEMY OF OPHTHALMOLOGY.

November 13, 1925.

Dr. D. L. Tilderquist, Presiding.

Copper Particle in Iris.

Dr. C. N. Spratt reports a case of a man, aged 51, who was injured by premature explosion of a dynamite charge. Both ear drums were ruptured and the vision in the right eye was reduced to light perception due to opacities in the vitreous. Vision in the left eye was reduced to shadows and there was a traumatic cataract. The cataract in the left eye was needled and later removed by suction, so that the vision now equals 20/40 plus.

The reason for showing the patient is that in the inferior nasal portion of the iris is a particle of copper, less than ¼ mm. in diameter. It is generally held that copper in the eye is more serious than almost any other material as it is apt to be acted upon by the fluids of the eye and give rise to irritation. It would be interesting to know what the experiences of the other members are in such cases.

Dr. Spratt said he would attempt to remove this copper with a small piece of the iris.

He also stated that one interesting thing about this case is that under a recent decision of the Supreme Court of Minnesota this man is entitled to compensation for total loss of vision in both eyes, altho the vision with a lens equals 20/40 plus in the left eye.

Discussion. Dr. Camp stated that he had seen recently an injury resulting from dynamite cap explosion. The boy stole a dynamite cap and was picking at it with a knife. Three fingers of the left hand were lacerated, the face and upper chest were studded with copper fragments, and he got four pieces in the left eye so that it was necessary to enucleate it. Dr. Camp stated, however, that he had not seen any copper cases of long duration.

Dr. Ericson stated that he had had a case in which there was a piece of copper in the eye for fourteen or fifteen years. It produced some irritation near its point of entrance and for that

reason he had to try to get it out, altho the patient had pretty good vision. He said he had to use the strongest kind of forceps he could get to remove that piece of copper. The sclera was very tough and the copper was imbedded there. Removal did not produce any irritation or reduce the vision.

Dr. Fulton said he did not remember having any patient with copper in the eye, but he agreed with Dr. Spratt in saying that this piece should be removed.

Dr. E. J. Brown said that some twenty or more years ago a carpenter was doing some chiseling on a brass lock and a small piece of the brass entered the eye. He stated he had not looked up the notes on that case, but his recollection was that the piece, which he could see, was in the anterior chamber very near the limbus. He made a small opening thru the cornea and got the little piece of brass out with a forceps. The eye went bad for a while but finally quieted down and has not made very much trouble since. Some two or three years ago Dr. Brown was at Morris and got a call from his old patient. Dr. Brown found he was having very high tension in that eye, with a good deal of pain, but this was quieted down with miotics.

Dr. Morton stated that he had had but little experience with copper or brass in the eye. He thought it was interesting, if it were true, that the chemical changes are such as to make the copper injury more dangerous than other metals, and he felt that unless this was markedly so, he could not see why copper injury would not be subject to the same rules that other metals are. He said that of course this piece was in the danger zone and subject to the same surgical indications. He had had quite extensive experience with stone injury, both penetrating and otherwise, and he supposed it was a familiar fact to the members of the Academy how peculiarly malignant these injuries are. The "stone cutters' injuries" stand in a class by themselves and Dr. Morton said that one must never be deceived by an injury, however small, that comes from almost any variety of stone. The larger injuries are almost sure to be fatal to the eye. He said he had seen more cases of panophthalmitis from stone than from any other cause. The effects of very small particles such as cinder, emery, etc. are more easily cast off, but when it comes to stone it is more likely to result in a serious case. These abrasions ulcerate more deeply, the injury seems a much more malignant and incurable type and has an unusually peculiar relationship to the etiology. He had seen two such injuries in the last two weeks; both minor injuries apparently, but very unresponsive to treatment. He usually found that in the treatment of these cases, curettement is not the safe procedure that it is in some other cases with a different etiology. They have to be handled very carefully and with a good deal of patience. He stated that he had much faith in mercurochrome.

Dr. Ericson asked Dr. Spratt as to the procedure he intended to use in removing the copper from the eye.

Dr. Spratt stated that he had brought this patient up as an example of what one may run across. He thought he would remove the piece with an iridectomy forceps as it was in the iris. He said he had perhaps a dozen patients with steel that had gone clear thru the eye and into the orbit which would probably never cause any irritation; also perhaps half a dozen with steel in the sclera, who had never had any trouble. He had under observation at the present time a patient who had come down to have the right eye operated on. There was marked discoloration in the left eye and X-ray showed a foreign body in the vitreous.

Dr. Shellman recalled a patient, a miner, who had carried a piece of copper in the eye for 40 years. About 40 years previously he had been advised in London to have the eye enucleated, but had not done so. It had been pretty nearly a normal eye—did not seem discolored, had pretty good vision, and had not troubled the patient.

Dr. Shellman recalled that in the New York Ophthalmological Society one evening was spent on the discus-

sion of foreign bodies in the eyes. As he recalled, there were two cases and in one the foreign body was copper. The consensus of opinion at that meeting was that glass was the least harmful and copper the most harmful. The copper was encapsulated in the vitreous and had never been removed. One man had expressed the opinion that if the copper is in the iris it is apt to cause irritation; it is always a menace and if it can be easily gotten at it should be removed.

Retrobulbar Neuritis.

Dr. F. N. Knapp first saw the patient October 28, 1925, who complained of blurred vision. He was a real estate salesman, 45 years of age. His visual disturbance was first noticed by him the last of August 1925. Patient complained of nyctalopia for two months. Glasses were sold by an optician which did not relieve the patient. This man was an excessive smoker, using a pipe and cigars. He drank about two quarts of moonshine during the summer. He had typhoid fever when 25 years of age. He is married and has a boy and girl who are both well. His father died of diabetes and his mother of senility. The vision was 10/100 in both eyes. This could not be improved with glasses. Urine and blood Wassermann were negative. Blood pressure was normal. All external ocular structures were negative. The pupils reacted normally to light and accommodation. Light projection was good in all directions. Ocular tension was 18 mg. in both eyes. The temporal halves of the right and left optic discs were slightly pale in appearance. The vitreous was negative in each eye. In the right eye there were four or five small white areas 5 mm. above the macula. In the left fundus there was a small pigmented area slightly below the optic disc and between the disc and the macula. No lesion was found at the macula of either eye. The form fields were normal. There was a reduction of the blue and red fields. A small absolute central scotoma for red was present in each eye surrounded by an area for relative scotoma for red. There was no scotoma for blue. The patient had no green field.

Discussion. Dr. Tilderquist stated that he had seen the case with Dr. Knapp and verified the findings which Dr. Knapp described. He said they had used a red free light to determine if any changes in the nerve fibers of the retina were present, but they had found nothing that had not been seen by ordinary ophthalmoscopy.

Dr. John Brown asked Dr. Knapp how he associated the spots in the retina with the toxic amblyopia.

Dr. Knapp replied that that brings up the theory of whether this is an inflammation of the optic nerve or whether it is a disturbance of the retinal ganglionic cells. These spots were very small white areas in the right eye. The small pigmented area in the left eye was at the termination of a small retinal vessel. None of these visible changes were at the macula.

Dr. Morton called attention to the fact that the etiology of amblyopia shows absolutely divergent points of view as far as tobacco was concerned. He stated that Dr. van Milligen, who spent a great deal of his life in Constantinople, said he never saw among the Turks a case of toxic amblyopia from tobacco, and of course it is well known that the Turks are inveterate smokers. Dr. Morton said that a great many believe that toxic amblyopia from tobacco could not exist, whereas it has been one of the classic beliefs that tobacco was a cause of toxic amblyopia. As to other causes, alcohol, etc., there could be no doubt. He had seen unquestionable cases of toxic amblyopia due to tobacco, with characteristic field changes for color and form, and with recovery after withdrawal of the tobacco and administration of the iodides.

Dr. Robinson stated that buried in the archives of the American Board of Ophthalmic Examinations he had a series of 48 cases of socalled toxic amblyopia, all supposed to be from nicotin poisoning. The diagnosis had been made by members of the staff at Moorfields, and had all been based on the functional findings of paracentral scotomata for red and green. He had later examined all of these cases as a

follow-up study. In only 2 in the series of 48 were abnormal changes found in the fundus beyond the disc; nor even in these were complicating infections fully excluded; one of them, indeed, lacked a Wassermann test, owing to the limited laboratory facilities during the war.

Incidentally, Dr. Robinson stated that in reviewing the rewritten histories of these cases, Mr. Holmes Spicer had firmly called his attention to the tradition at Moorfields, cherished since the days of Hutchinson, that the moderate use of alcohol ("three pints of stout" or "a glass or so or gin per diem," as some of the histories read) retarded rather than augmented the development of tobacco poisoning of the optic nerve, the feeling in London being that too much stress was laid in America at the door of alcohol in these cases.

Dr. Virgil J. Schwartz read the paper of the evening entitled, "Three Friends Who Made Ophthalmologic History—Bowman, Donders, and von Graefe."

Walter E. Camp, M.D.,
Recorder.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

November 16, 1925.

Dr. E. L. Roberts, Chairman.

Tubercle of the Iris.

Dr. Fred Hasty presented the case of a woman, aged 30 years, with tubercle of the iris. The patient's mother, father, two brothers, and three sisters were all living and well. She had had perfect health until about three and one-half months previously when she discovered that she had dimness of vision in the right eye. This slowly cleared up, and one week later she had a hemorrhage into the anterior chamber of her right eye. Since then she has had six recurrent hemorrhages. Following the first hemorrhage she noticed a small growth in the iris of the right eye. This gradually increased in size, until at the present time it was about 1 mm. in diameter. The mass was nonvascular and arose from the angle of the iris. There was no pain and the vision was normal and the eye was negative in all respects except for the new growth. A diagnosis of tubercle of the iris was made. The patient was given tuberculin treatment, and referred to the County Tuberculosis Hospital.

Bilateral Congenital Aniridia With Dislocation of the Lens.

Dr. Fred Hasty presented a case.

Absolute Glaucoma.

Dr. Robert Sullivan showed a case.

At the meeting of October 19, 1925, the following officers were elected: Dr. E. L. Roberts, Chairman, Dr. J. P. Crawford, Vice-Chairman, Dr. R. J. Warner, Secretary-Treasurer.

R. J. Warner,
Editor.

December 21, 1925.

Dr. E. L. Roberts, Chairman.

Bilateral Dislocation of Lens.

Dr. E. B. Cayce presented a case of bilateral dislocation of lens in a boy, age 11 years.

Angioma.

Dr. E. B. Cayce presented a case of angioma, upper lid, in a baby, age two months.

Discussion. Dr. Hilliard Wood suggested the use of radium, and if that is not effective electrolysis should be tried.

R. J. Warner, M.D.,
Editor.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

December 8, 1925.

Dr. R. W. Hooker, Presiding.

Lipemia Retinalis.

Dr. E. C. Ellett presented a boy, aged 21, who had had evidence of diabetes for two years. Routine examinations showed the condition sometimes seen in diabetes and ascribed to fat in the blood. The retinal veins and arteries looked similar, like broad flat ribbons filled with a salmon pink fluid instead of the usual blood. The blood sugar was 335 m.g., per 1000 c. c.. as

compared to the normal 100 m.g. There was no disturbance of vision nor any hemorrhages or exudates in the retina. The condition varies from day to day, and now the changes are hardly noticeable. A few days ago they were very marked.

This condition is not very rare, tho only about forty cases have been reported. The blood when drawn into a test tube shows a milky color. While usually found in diabetes, lipemia may occur in pregnancy, chronic alcoholism, nephritis, disease of the liver, malaria, tuberculosis, cholera, and phosphorus poisoning. The retinal changes may entirely disappear and do not give rise to organic changes or affect the vision. Retinal changes do not occur until the fat content of the blood is 5 per cent.

Foreign Material in Anterior Chamber.

Dr. James L. Stanford presented a boy 11 years old who was told by the school nurse that his vision was defective. On examination the left eye was found to be amblyopic, being about 2 D, myopic. In the anterior chamber of this eye was a disk shaped dark brown body about 1½ mm. in diameter. The body was fixed at the bottom of the anterior chamber. The mother had noticed this since the baby was a few days old. Delivery had been by forceps and attended with much trauma about the head and face.

The vision in the other eye was 20/25 improved to 20/15 by +0.50S., with +0.25C. Ax. 30°.

Discussion. Dr. J. B. Blue said the body seems to be movable.

Dr. E. C. Ellett said it seems to be a body analogous to "sooty bodies" usually seen at the edge of the pupil in the horse. It is attached by a slim pedicle to the iris.

Dr. P. M. Lewis asked if it was possible for it to be an encapsulated foreign body.

Dr. Stanford (closing) said that the mother noticed the body a few days after birth.

Foreign Body in Eyeball.

Dr. M. B. Seligstein reported the case of Mr. M. P., aged 28, first seen April 11, complaining that while hammering on a piece of case hardened steel, a piece flew off and he felt a slight pain in his eye. External examination; right eye normal, vision 15/15. Left eye vision 15/70. Mild conjunctival and pericorneal injection. Cornea clear, no abrasion seen, pupil reacted promptly to light and accommodation, no blood in anterior chamber. On the iris at three and nine o'clock were two brown spots about two millimeters in diameter which looked like iris pigment. No foreign body was seen in the conjunctival sac.

The eye was irrigated with boracic acid and he was given a prescription for 10% solution of neosilvol and told to return next day if there was no improvement.

The patient was not seen until one week later. The redness had cleared up but the vision was still bad. His left eye was again closely examined and it was noticed that surrounding one of these spots which was apparent as an iris pigment spot, there was a white zone of atrophy. Close examination showed this to be a hole in the iris at nine o'clock about two millimeters in diameter.

The pupil was at once dilated with hyoscin and atropin and the nasal and upper part of the lens was slightly opaque. A black shining object which appeared about 7x10 millimeters or larger was seen sticking in the choroid and sclera about two disc diameters to the nasal side of the disc.

An X-ray picture localized the foreign body within the eyeball. Under local anesthesia the eyeball was opened behind the equator as far back as possible with a Graefe knife and the electric magnet applied. After many unsuccessful attempts the piece of steel was removed and the opening in the sclera closed.

Two months later he returned and the vision in the left eye had gone down to light perception. The pupil was again dilated and the posterior capsule was found to be completely opaque.

Parinaud's Conjunctivitis.

Dr. H. W. Qualls reported as follows: Mrs. P. A. V., age 21, was re-

ferred to him March 1, 1924. Mr. J. B. H., age 52, was referred to him Jan. 7, 1925. Mr. G. W. B., age 26, called to see him Oct. 14, 1925. The disease was unilateral and on the right in each patient. Each patient had large polypoid, pedunculated, reddish granulations on the tarsi, in the fornices and on the ocular conjunctiva. The granulations were covered by a mucopurulent discharge. Each patient had temperature from 100 to 101 deg. F. on the diseased side. In each the parotid gland was very much swollen; the submaxillary and cervical glands could be palpated. The visions in the diseased eyes were 20/70. All three patients were typical text book cases of Parinaud's conjunctivitis. In spite of this fact the first patient was sent in with a diagnosis of malignancy and for complete exenteration of the orbit.

The three received the same treatment. The swollen part of the face was well covered with 25% ichthyol in collodion. This was applied the first day of the treatment. It can be removed about the third day. Mercurochrome 2% was instilled into the eye three times daily. Each patient rapidly improved under the treatment and was entirely well at the end of two weeks.

The cases were reported for two reasons: First, because the condition is comparatively rare; and second, because the disease responded so rapidly to instillations of mercurochrome. Text books state that Parinaud's conjunctivitis is a self limited disease, running a course of from a few weeks to a few months. Some state from two to six months. These cases were entirely well in two weeks with normal vision and a smooth conjunctiva. Such rapid improvement in each case leads him to believe that mercurochrome is a specific for the disease.

Discussion. Dr. J. B. Stanford asked if there was any history of close association with any domestic animals.

Dr. Qualls answered that one patient had a pet cat and another had a pet dog.

Membranous Conjunctivitis.

Dr. E. C. Ellett reported further on a case of membranous conjunctivitis shown at the last meeting.

The membrane is pulled off occasionally and bleeds freely. The eyeballs look practically well but the membrane persists and is attached to the upper fornix. Mercurochrome is now being used. Only ordinary pus bacteria are found.

P. M. Lewis,
Secretary.

SOCIÉTÉ FRANCAISE D'OPHTALMOLOGIE

The next Congress of the Société Française d'Ophtalmologie will be in Paris during the second week in May. The first session will be held on Monday, May the tenth. A report upon "The Microscopic Examination of Affections of the Eye by Means of the Slit Lamp" will be presented by Professor Gallemaerts of Brussels. Those desiring information concerning the Congress should write to Doctor René Onfray, 6 av. de la Motte, Picquet, Paris 7e.

American Journal of Ophthalmology

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MARCUS FEINGOLD

This careful, productive, persistent worker in ophthalmology finished his labors for his fellow men December 26, 1925. Those who had the opportunity of personal acquaintance with him, may now speak freely of the impression he made on them; and some who come after may estimate his place in the long line of those who have given their best endeavors to the building up of medical science and art.

Born in Rumania and educated in Austria, he made America his home, mastered its language both for speech and writing, early became the head of his department in one of its leading universities, speedily demonstrated his fitness for such leadership. In half of what would be an average professional life, he left an important impress upon the world's knowledge and practice of ophthalmology.

As a book lover, he brought together, arranged and classified probably the best private collection of ophthalmic literature in this country, used it for inspiration, for help in research and practice, to ensure the completeness of every paper he published; and leaves it, a well prepared and tested tool, for the intelligence of those who come after him.

His habitual attention to detail, his readiness to understand and test new ideas, his modest, quiet, unaggressive, inquiring way of stating the thought he had, his constant desire that the best should be done in every situation, made him an effective helper and leader in every organization with which he was connected.

From the beginning, he was a most active, loyal, efficient supporter of this journal, always to be relied on for wise counsel, plodding routine labor and broad comprehension of problems, essentially new to those who sought to go forward in the production of an American literature of ophthalmology. He brought to this service such wide reading, keen intelligence, unflagging zeal for high standards, and enduring patience, that those who have worked with him here, would join his fellow workers of Tulane University and Touro Infirmary, his wide circle of patients, his close friends and his family, in appreciation of his work and in sorrow for a common loss.

E. J.

INTERNATIONAL COOPERATION IN OPHTHALMOLOGY.

At the Convention of English Speaking Ophthalmological Societies, held in London, July last, it was: "Resolved that this Convention of English-Speaking Ophthalmological Societies hereby empowers its President, Mr. E. Treacher Collins, to appoint a standing committee of five of which he shall be chairman. The duty of this committee shall be to obtain such cooperation as is possible from representatives appointed by the various National Ophthalmological Societies in the promotion of an International Ophthalmological Congress."

Being specially invited to speak on this resolution Mr. Collins briefly outlined the way such international congresses had heretofore been brought together: "He thought it was most desirable that a committee should be now appointed who should, so to speak, hold a watching brief. He would much rather that the initiative in the matter should have been left in other hands than his, but if it were the general wish of the meeting he would endeavor to carry out the onerous duty to the best of his ability." Mr. Collins has now performed this duty and the Committee consists of: Mr. E. Treacher Collins, Chairman; Sir John Parsons, Mr. Leslie Paton, Dr. George E. de Schweinitz and Dr. Edward Jackson.

In connection with this effort to bring about the holding of a new International Congress of Ophthalmology, it should be remembered that when the first Congress of the kind was held in Brussels in 1857, there was not in the civilized world any national organization of ophthalmologists. That year Graefe gathered a few friends together, to discuss questions of mutual interest. But three of the International Congresses had been held before the American Ophthalmological Society was formed, or the Heidelberg Congress had become a well established scientific body. It was the plan of organization adopted at the Third International Congress of Ophthalmology that was closely followed for subsequent gatherings.

At the close of one Congress the city or country in which the next should be held was chosen; and a chairman with a committee empowered to add to its number was named, to whom was entrusted the whole organization of the next Congress. In this way each Congress was essentially an organization *de novo*. There might be no one on the committee for one Congress who had been interested in the organization of any preceding congress, or would take part in any later one. During the intervals between these congresses there was no international body thru which ophthalmologists of different countries might be kept in touch with one another.

When on the motion of Dr. Lucien Howe of Buffalo, the London Convention authorized this committee to seek cooperation from national bodies as the basis for future International Congresses, it was a step forward in the organization of such bodies; it was an advance in harmony with the general broadening development of international relations and world interests. In ophthalmology the time is ripe for such a step.

The American Ophthalmological Society, organized in 1864, has shown its intelligent loyalty to the broad purpose for which it was founded, by entering into close association with its younger national rivals, the Section on Ophthalmology of the American Medical Association, organized in 1879, and the American Academy of Ophthalmology and Oto-Laryngology which started as the Western Society in 1898. From this association have sprung two important things, the American Board for Ophthalmic Examinations and the Washington Ophthalmological Congress.

The group of Graefe's friends grew into the Heidelberg Congress, which in time assumed and now appropriately bears the name Deutsche Ophthalmologische Gesellschaft. The Ophthalmological Society of the United Kingdom of Great Britain and Ireland, organized in 1880, has become, thru its affiliated societies, representative of the British Empire. The Société

Française d'Ophtalmologie came into being in 1887; and has pursued a broad policy that made it representative of French speaking ophthalmologists thruout the world.

The Sociedad Oftalmologica Hispano-Americanos recognized in the name it adopted, at its organization about 30 years ago, the needs of Spanish speaking ophthalmologists in America, as well as Europe. The Societa di Oftalmologia di Italia, established in 1889, represents the ophthalmologists of Italy in the broadest national sense.

There are many other national organizations the relations of which are illustrated by those mentioned. In brief, thruout the world there are organizations national, or with a broader membership, on which the organization for the holding of international congresses and other forms of international cooperation should logically rest. The committee authorized by the London meeting is to extend the invitation to the various national bodies representative of ophthalmologists, to take part in the discussion and we hope formation, of the best representative international body that can be devised, to bring about the most effective cooperation of all who are devoting their time and energies to the development and practice of ophthalmology.

As became evident in the discussion regarding this movement (British Journal of Ophthalmology, v. 9, p. 458) the members of the London Convention realized "That if a body of delegates representing different national ophthalmologic societies could be formed, there were other matters which might be referred to it for consideration, besides the reestablishment of international congresses." It is desirable that the members of the committee named be informed of such matters by individual ophthalmologists who see their importance; so that in forming an international organization there may be the best possible understanding of what such an organization might do, and the best adaptation of it to the accomplishment of desirable practical results. E. J.

COMPENSATION FOR EYE INJURIES

In 1919 a committee on compensation for eye injuries was appointed by the Section on Ophthalmology of the American Medical Association. This body, composed of Drs. Nelson M. Black, Albert C. Snell, James Patton, and Harry S. Gradle, has presented an exceedingly concise and practicable plan which was approved and unanimously adopted by the Ophthalmic Section of the American Medical Association and later by the American Academy of Ophthalmology and Oto-Laryngology.

In such a complicated matter, it would be impossible to satisfy every one entirely, but there is so much need for an immediate solution of the problem of compensation and for uniformity of state laws in this particular, that it is hoped that every ophthalmologist will support this report even tho it does not conform in all particulars to his ideas. No group has studied this subject more carefully than this committee and no better suggestions than these have been made.

The adoption of the report by the state medical societies is the preliminary to its incorporation in the state laws. It is, therefore, urged that this matter be considered by each state medical society and the recommendations of the committee adopted. Thus sponsored, it should be possible to secure the favorable action of the state legislatures and a definite advance will have been made in solving the question of compensation. L. T. P.

BOOK NOTICES.

Festschrift für Friedrich Dimmer. Band 57, Zeitschrift für Augenheilkunde. Paper, 8vo., 640 pages, 21 plates and many figures in the test. Berlin, S. Karger, 1925.

This volume, dedicated to the celebration of Prof. Dimmer's seventieth birthday, Nov. 7, 1925, by his colleagues, friends, and pupils, includes 42 papers, of solid scientific value, by 41 different authors, most of them of high rank in the literature of ophthal-

mology. The first two papers are by E. Fuchs. Rarely has it been the fortune of the recipient of such an honor to have the first two papers of his Memorial Volume from the pen of his immediate predecessor, who retired from this clinic four and one-half years before.

The other papers are grouped under the headings of the 11 different clinics with which their authors are connected: The University Eye Clinic of Innsbruck, Prof. Seefelder, director; The University Eye Clinic of Graz, headed by Prof. Salzmann; the First University Eye Clinic of Vienna under Prof. Meller, 11 contributors; Prof. Dimmer's own University Eye Clinic, 7 contributors; the Wiener Hospital, Vienna, Prof. Sachs; The Lainzer Jubilee Hospital, Vienna, Prof. Lauber; The Rudolph Hospital, Vienna, Dr. Hanke; the Vienna General Polyclinic, Dr. Lindner; the Franz Joseph Jubilee Hospital, Vienna, Dr. Hirsch; The District Hospital of Klagenfurt, Dr. Purtscher; the University Eye Clinic of Zagreb, Yugoslavia, Director Prof. Botteri; and one from Dr. Baer of Meran.

This volume is the work of the Vienna School; but it is still the greatest school of ophthalmology in the world, and has rallied nobly to honor one of its great leaders. The school that would rival or surpass it must lay broad foundations of scientific research, raise high ideals of teaching service, and manifest mutual loyalty, and unselfish devotion to long years of labor, only requited by the consciousness of great achievement.

The titles of the papers included in this volume will be found arranged according to their respective topics in "Current Literature." The papers of the elder Fuchs, Salzmann, Meller and Seefelder will be read by their admirers with familiar interest and profit. Those of Hesse, Bachstez, Kraemer, Guist, Pillat, Sachs, Lauber, Hanke, Hirsch, Purtscher and Baer will add to their established reputations. The younger Fuchs has gracefully linked the names of Haab and Dimmer with grill like degeneration of the cornea; and Karl Lindner speaks with authority of the difficulties of trachoma investigations—difficulties which he more than any one else has overcome.

The frontispiece is a reproduction of a photograph portrait of Dimmer. The 21 plates include 9 in colors, and all are of general interest and permanent value. Among them appear, in connection with the paper of Hesse, photography of the fundus, in the perfecting of which Dimmer's work was most important. The papers and press-work of this volume come up to pre-war standards. It is a matter for rejoicing that the German custom of issuing such Jubilee volumes has survived the war; and that such splendid specimens, as that for Fuchs and this for Dimmer, have been put forth amid the difficulties of the postwar period. It augurs well for the vitality and prestige of science, that this has been possible. E. J.

Lefthandedness. A New Interpretation. Beaufort Sims Parson. Cloth, 12mo., 193 pages, 10 illustrations, New York. The Macmillan Co., 1924.

The "foreword" to this book is by Harvey E. Jordan, A. M., Ph. D., Prof. of Histology and Embryology in the University of Virginia, who says: "The righthanded individual is almost invariably also rightlegged, and possesses greater acuity of sight and hearing on the right side. The left-handed individual is characterized generally by the reverse condition."

To what extent and in what sense is it true, that the righthanded possess greater acuity of sight on the right side? This is a subject worthy of investigation. The interpretation of left-handedness which is here offered is, that it arises from the economy of effort made possible with the grouping of the effective brain centers—the dominant centers—as closely together as possible; and that in this it is the eye that directs the hand.

To quote Parson's own words:

"Now in addition to the duplicate faculties which characterize all bilateral forms, man has developed cer-

tain dominant single faculties, such as speech and memory, which cannot be classed as belonging to either side of the body exclusively, but rather to the organism as a whole. In a general way it can be stated that we find the neural areas which innervate these highly complex single faculties *grouped in the same hemisphere that contains the centers controlling handedness and eyedness.* This close associative arrangement, it need scarcely be pointed out, affords the most direct and speedy coordination of sight impressions with intellect, will, and action."

Visual orientation must be made with reference to the right visual axis, or the left. The cyclopean eye and orientation to a visual line passing in the median plane of the body is a metaphysical conception; that does not correspond to any physical function of visual fields, or ocular or other body movement. The facts of lateral diplopia all show that we refer the position of images and the things that cause them to one visual axis, or the other. We can only "sight" with one eye at a time, and can sight most accurately, promptly and efficiently by always sighting with the same eye. Having to use one, or the other, we become either righteyed or lefteyed. Eyedness precedes handedness; and causes it by the greater efficiency of having the dominant hand center, as near as possible to the dominant eye center.

This interpretation which Parson has put forward, is of great interest to ophthalmologists. The chapter headings of the book indicate the lines along which his idea is advanced. The first chapter gives the "Principal Theories in Regard to Handedness," culminating in the theory of ocular dominance. It briefly traces the historic line of advance thru the writings of Humphry, Le Conte, Callan, Flint, Geo. M. Gould, Stevens and Jordan. The other chapters are headed: II Brain and Hand; III Heteromymous and Homonymous Images; IV Unilateral Sighting; V Handedness; VI Righthandedness; VII Tests for Detecting Native Handedness; VIII Preliminary Manuscopic Tests; IX Tests at Elizabeth, New Jersey; X Concluding Remarks. There is appended a bibliography of 47 pages and a good Index.

This is a book that is worth having. The body of the book can be carefully studied with profit by every ophthalmologist. It will clear and extend his ideas regarding ocular movements. It will give him a broader conception of the relations of ophthalmology, and especially physiologic optics, to other branches of medical and biologic science. The bibliography based, as it evidently is, on very wide reading, makes this little volume of great permanent value as a work of reference.

E. J.

Societa Italiana di Oftalmologia. Atti del Congresso, October, 1924. Paper, royal octavo, p. 380, 7 plates (one in color) with illustrations in the text. Rome, 1925.

The transactions of the Italian Ophthalmological Society are published in attractive form. The heavy, highly finished paper, large pages and excellent printing, evidence good taste and the belief that papers relating to the eye are worthy of best services of the printer's art. The volume contains 103 papers and the discussions to which they gave rise. Since 28 pages are occupied with other matters and some space by the discussions, it is evident that the average length of these papers is little over three pages—which would make about two pages of this journal. The Society meetings occupied less than four days. It is easy to demonstrate mathematically that the communications brought to its attention were brief, and they were generally to the point.

Of the 303 members, 137 attended the meeting and of these 92 took an active part in the program. A wide range of subjects was covered including those like cataract, glaucoma, trachoma, etc., that are brought up in all ophthalmologic societies. In the glaucoma symposium there were 5 papers. There were 7 on trachoma. Cataract had its share and there were several devoted to therapeutic measures. Each of these is mentioned under its appropriate heading in Current Literature.

Altogether the impression is gathered that the Italian Ophthalmologists are very much alive to the progress of their specialty. A few report rather complete studies— Lo Cascio, 10 pages on research regarding renal neuroretinitis; Contino, 7 pages on the structure of the vitreous; and D'Amico, 16 pages on siderosis of the eyeball.

Among the plates is one reproducing photographs of the meeting and one of medals awarded to Foalchi and Rampoldi at the opening session of the meeting. The other plates show histopathology and the results of inoculating the anterior chamber of the rabbit with lepra bacilli. This volume contains, also, the By-laws of the Society and its list of members. There is no alphabetic index of names, or subjects treated in it. A serious omission, if it comes to be used as a work of reference. E. J.

Ophthalmological Society of Egypt, Bulletin of 1925. Paper, octavo, 94 pages, 9 illustrations. Cairo, Egypt, 1925.

Altho the title appears on the first cover page in Arabic, this volume is printed wholly in English. The Society was founded in December, 1902. It now includes 107 members and 13 honorary members. The former are almost all natives of Egypt, into whose charge have passed the Government Hospitals established thru British influence under the direction of MacCallan who, like three other British members, now resides in England. Of the authors of the 19 papers published in this volume, but 3 appear to have learned ophthalmology chiefly outside of Egypt. These papers were read at the meeting held March 6, 1925, at which time it would appear no visitors from other countries were in attendance.

It is notable that at this meeting the Honorary Secretary, Mohammad Khalil, proposed the establishment of a circulating library, and was instructed to report upon the project at a future meeting. This was 7 months before a similar proposition was brought before the Chicago meeting of the American Academy of Ophthalmology and Oto-Laryngology. It illustrates the unity of needs for ophthalmology and of ideas extant in opposite hemispheres.

The papers and discussions here printed are properly listed under Current Literature. Among the more notable of them are: "Preliminary Ligature of the External Carotid Artery in Operations on the Orbit," by Dr. R. V. Dolbey of Cairo. "Akinesis in Cataract Extraction," by M. Tewfik. "An Operation for Ptosis," by M. Azmy El Kattan, of Cairo. "Milk injections in Eye Operations," by Dr. Balky of Port Said; and "11 cases of Sympathetic Ophthalmia," by Dr. M. Zaki, of Beirut. These, and other papers contained in these transactions, are thoroughly creditable and interesting. They would be acceptable in the meetings of any ophthalmic organization of Western Europe or America. To know what others are doing, gives one a more modest and just view of the importance of the work in which he has been individually concerned.

E. J.

Transactions American Ophthalmological Society, Vol. XXIII. Sixty-first Annual Meeting, 1925. Cloth, 8 vo., 363 pages, 24 plates, 2 in colors, and 35 illustrations in the text. Published by the Society.

This series of Transactions contains the records of more annual meetings devoted to ophthalmology, and goes back farther into the last century, than do the transactions of any other national organization. Seven years before the organization of the American Ophthalmological Society the first International Congress of Ophthalmology was held at Brussels. In the same year, 1857, Graefe gathered together a small group of friends to discuss subjects of mutual interest. But it was many years before this organization grew to be, and properly assumed the name of, the Deutsche Ophthalmologische Gesellschaft; and so many annual meetings were omitted that the total held has been fewer than that of its American counterpart.

The earlier volumes of these transactions are very scarce. Even now the number of copies published is so small

that they will become scarce, as the number of trained ophthalmologists interested in ophthalmic literature increases. The series averages more important papers relating to ophthalmology, more papers of interest and significance in the history of the specialty, than any other series of volumes that have been produced in America; and this twenty-third volume well sustains this claim to importance. It has been the policy of the Society to choose, for its limited membership, those who had demonstrated by their published work that they were likely to contribute papers of value to its transactions.

In this volume, the contents are: Lists of Officers and Council, former Presidents, Members and those who had died during the preceding year. Under Necrology are biographic notices of: William S. Dennett, who worked out the first electric ophthalmoscope and suggested the centrad as a unit to designate the refractive power of prisms; Frederick E. Cheyney, for many years Surgeon and Chief of Staff of the Massachusetts Charitable Eye and Ear Infirmary; and Dwight W. Hunter, long closely associated in practice and teaching with the late Henry D. Noyes. The minutes of the Annual Meeting occupy 15 pages. Then come 20 papers read and discussed before the meeting, and 5 theses submitted by accepted candidates for membership. These papers and theses are listed under their appropriate headings in Current Literature. They contain many things that should be brought to the attention of the readers and so small a part of our readers will become acquainted with them in the original, that we shall draw upon them for our abstract department. E. J.

Government Ophthalmic Hospital Madras Report for 1924. Major R. E. Wright, I.M.S., Supt. Paper, quarto, 26 pages, 3 plates with 17 ills., Madras. Government Press, 1925.

The scientific observations recorded in this report deserve to be more widely known among ophthalmologists. We shall draw on it rather freely for our abstract department. The 3,951 indoor patients and the 23,430 outdoor patients include a very large number of rare and interesting cases. Their statistics deserve careful consideration, for the results obtained by various methods of treatment.

The cataract extractions numbered 1,493, of which 1,237 were done with capsulotomy, 44 as simple extractions, 688 with complete iridectomy and 505 with peripheral iridectomy. Over 90 per cent were "successes;" V. = 1/6 or better, and 6 were failures. Of 103 extractions in the capsule, 61 obtained vision of 1/6 or better and 12 are put down as failures, V. less than hand movements. There were 66 lacerations of opaque capsule.

Of the glaucoma cases, 112 underwent trephining. Only one of these was an early case without impaired vision. In 25, vision and tension were improved. In 75, tension only was improved. In 11, there was no improvement. There were 51 eyeballs removed for glaucoma and 93 evisceration. There were 136 iridectomies done, apart from 188 for artificial pupil. Herbert's operation for glaucoma was done 13 times.

A series of 73 cases of corneal ulcer were examined for the pneumococcus. Of these 28 were positive and 47 negative. Among those that proved positive, 1 belonged to type I, 2 to type II and 22 to type IV. Of the different kinds of conjunctivitis, that due to the Koch-Weeks bacillus takes the lead with 1,916 cases. Angular conjunctivitis (diplobacillus) 412 cases. Phylctenular conjunctivitis 703. Trachoma 803 and follicular conjunctivitis 127.

A notice on the cover indicates that this publication may be obtained thru any bookseller; or direct from the office of the High Commissioner for India, 42 Grosvenor Gardens, London, S. W. 1. E. J.

Swanzy's Handbook of the Diseases of the Eye and Their Treatment edited by **Louis Werner,** M.B., F.R.C.S.I., Sen. Mod. Univ. Dub. of Dublin, Ireland. Thirteenth Edition. With illustrations. Published by P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa.

"Swanzy's Handbook" came out forty years ago, and it has now reached

the 13th edition,—a posthumous edition brought out by the author's friend and colleague, Louis Werner. The reviewer has had the pleasure of noticing most of these issues in the journals with which he has been connected. This is the textbook *par excellence* of the British Medical student. While it has grown slightly in the number of pages with each edition, a process of elimination has occurred, dropping out the old and bringing in the new.

The scheme of the book deals first with various forms of physical examination, the ophthalmoscope, and then the chapters go on with the description of diseases in an anatomic order, followed by chapters on ocular diseases and symptoms accompanying brain and general diseases; a chapter on elementary optics and abnormal refraction and accommodation; the ocular muscles, and then the diseases of the eyelids, lacrimal apparatus and orbit; completing it by an appendix on visual regulations for candidates for admission to various government services.

Inserted thruout the book, in addition to 275 black and white illustrations in the text, are 9 colored plates of the fundus, beautifully drawn by Louis Werner, and well reproduced.

The book is indeed a *multum in parvo*. Very few accepted descriptions of diseases, anomalies and complications or mechanical, medical or operative procedures are omitted. It is recommended as a textbook for all students.

H. V. W.

Newer Methods of Ophthalmic Plastic Surgery by **Major Edmund B. Spaeth,** M.D., Chief, Eye Clinic, U. S. Army General Hospital, Washington, D. C. Clinical Instructor and Assistant in Ophthalmology, Army Medical School, Washington, D. C. 168 illustrations. Published by P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa. (See also p. 749, v. 8.)

This monograph is the result of personal and painstaking study of a vast number of cases, the majority happening from the effects of battle wounds and injuries; and from the trial of various operative procedures for the repair of mechanical defects due to such injuries. The incidence of industrial ocular accidents, while decreasing decidedly in the past few years, owing to the safety devices and education of the workingman, still is a definite factor; and these cases parallel the effects of injuries received during the War.

While a large experience with such cases is only to be obtained by the surgeon in large industrial centers, or as Chief Surgeon in such a Mecca for the afflicted as is the Walter Reed Hospital in Washington, yet every ophthalmic surgeon is called upon to do plastic work of some variety from time to time. I know of no work in which the American idea of expediency and efficiency is so well exploited as in this monograph. The reviewer had the opportunity of seeing the results of a number of cases treated by the methods advised by the author—in a number of instances the author's own work—and is impressed with the ability of the plastic surgeon to restore in a measure the natural appearance of an injured person's face, and in some cases to even improve upon nature!

It is believed that the experiences and advice of Major Spaeth are reliable guides to the correction of deformities of the ocular adnexa, and the student will do well to follow his instructions. The book is satisfactorily printed and has 170 illustrations in the text. It contains an appendix of works upon ophthalmic plastic surgery. This work of the Army Surgeon is indeed welcome to the private practitioner.

H. V. W.

Operative Surgery, by J. Shelton Horsley, M. D., F.A.C.S., Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va., 784 pages second edition. Published by C. V. Mosby Co., St. Louis, Mo.

This text containing 30 chapters, covers as the title indicates, practically the entire field of surgery. The operations described have either been used by the author or appear to be best suited to the disease. This second edition differs from the first in the addition of a chapter containing the most recent views of cancer and their bearing upon operations for malignancy.

Several new operative procedures are also described, which have heretofore not appeared in any surgical text.

Of especial interest to ophthalmologists are chapters 14 and 15, dealing with plastic surgery and operations on the face and mouth. The operation of Gillies for ectropion is clearly described together with various other operations upon the eyelids and orbital socket. The illustrations by Miss Helen Lorraine are well drawn, clear, and easily understood, and the text is an excellent one for general surgical reference and guidance.

J. H. Harter.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Samojloff, A. J. Action of Adrenalin on Ocular Tension. Klin. M. f. Augenh., 1925, 74, May-June, p. 652.

Samojloff describes his investigations on the eyes of rabbits and cats and on glaucomatous patients. Adrenalin causes the tension in the eyes of rabbits to show a two phase curve, first, a decrease of tension from 1/2 to 3/4 of an hour after introduction, second, an increase, after which the tension remains more or less low. Before the beginning of the first phase, a brief increase occurs. After subconjunctival injection the decrease is more marked than after introduction of an adrenalin tablet into the conjunctival sac. The considerable and enduring decrease does not absolutely correspond to the general increase of blood pressure, which in these methods of application always was brief and irrelevant. In normal human eyes, adrenalin application is followed by distinct decrease. The phase of increase is not present at all or so little that it cannot be ascertained with the tonometer. Glaucomatous eyes in the first stage behave in general like normal eyes. In absolute glaucoma the characteristic decrease of tension does not set in, but the preliminary increase is marked. Adrenalin does not diminish the characteristic glaucomatous scotoma and has no noticeable influence upon the peripheral visual field.

C. Z.

Müller, P. Operation for Blepharospasm. Klin. M. f. Augenh., 75, 1925, July-Aug., p. 175.

After instillation and subcutaneous injection of 3% novocain-adrenalin solution, the skin of the upper lid is horizontally incised, 4 mm. distant from the lid border. Then the skin is dissected from the palpebral portion of the orbicularis, the muscle cut vertically, and the edges bluntly crowded apart. In the more severe cases, several muscle bundles are excised or several vertical incisions made. After exposing the upper margin of the tarsus, a thread is placed about 2 mm. from it, horizontally thru the tendon of the levator and the insertion of the tendon separated below the loop. Two incisions are made slightly diverging upwards on both sides of the portion taken up in the loop and the anterior surface of the muscle is freed. This strip is motilized and sewed into the gap formed by cutting the orbicularis as above described. The sutures are sewed just above the lid border from inside thru the skin and tied over a small bead. The wound of the skin is not sewed but the eye is covered with a shell without dressing. Ten cases are reported with satisfactory results.

C. Z.

Tron, E. Some Peculiarities of Vision of Squinting Persons. Klin. M. f. Augenh., 75, July-Aug., 1925, p. 109.

Tron found in monocular strabismus, divergens and convergens, a unilateral contraction of the visual field in the horizontal meridian. In strabismus of an angle larger than 25° this contraction occurs on the side to which the eye squints; of an angle smaller than 25° on the opposite side. There is no contraction of the borders of the visual field in alternating strabismus. In amblyopia from strabismus, peri-

pheral vision suffers less than central. The isopters have the same courses in the squinting as in the normally fixating eye, with the difference that in the normal eye they are situated farther to the periphery. The unilateral contraction of the visual field in strabismus shows the existence of an abnormal correspondence of the retina and may be regarded as indirect proof for amblyopia ex anopsia. C. Z.

Esser, A. Upper Lid and Muscles of Mastication. Klin. M. f. Augenh., 75. July-Aug., 1925, p. 118.

A girl, aged 17, stated that since birth her right upper lid raised when she opened her mouth. In moving the mouth from the median line to the left, or from the right side to the median line, or in moving the lower jaw forward, or in wrinkling the forehead, the upper lid raised. In biting the teeth together the right upper lid shows fine oscillations. In opening the closed right eye, the lower jaw moves to the left. Thus stimulation of the 5th nerve causes stimulation of the 3rd and of the 7th. nerves.

The literature is discussed. Some authors assume pathologic conditions in the origins of the nerves, others physiologic concomitant movements. The author is inclined to the latter theory. C. Z.

Ballantyne, A. J. Changes in Refraction Associated with Transient Glycosuria. Brit. J. Ophth., Oct. 1925, v. 9, No. 10.

This is a case record of a patient, aged 58 years, who developed glycosuria from drinking large quantities of soda water. This was remedied quickly by diet. About a month after dietetic treatment was begun the only eye which could be accurately tested showed an increase of hyperopia. Shortly thereafter the refraction returned to its former normal. The fellow eye had a progressive increase in the density of a lens opacity. No change in the refraction of this eye could be determined. D. F. H.

Gala, Anton. Instantaneous Stereo-Photography of the Anterior Section of the Eye with Considerable Magnification. Brit. J. Ophth., Oct. 1925, v. 9, No. 10.

The author mounts a stereocamera immediately above a binocular corneal microscope. It is essential that the angle formed by their axes should be as small as possible. A rack and pinion allows of lateral and vertical movements and can be clamped in any desired position. Alteration of the objectives of either instrument necessitates readjustment. The small field viewed thru the microscope is only a portion which will appear on the photographic plate. The microarc lamp with quartz condenser is the most suitable illumination. Dazzling of sensitive eyes may be avoided by the use of a grey disc filter during focusing. When all is ready, remove the filter and operate the shutter which is set for instantaneous exposure. Excellent photographs enlarged either 1.7 or 4.1 diameters can be obtained, the latter by using A2 objectives.

Four illustrations accompany the contribution. One, magnified 1.7 diameters, is contrasted with three magnified 4.1 diameters which depict in marked detail the structures under observation. D. F. H.

Gala, Anton. Observations on the Hydrogen Ion Concentration in the Vitreous Body of the Eye with Reference to Glaucoma. Brit. J. Ophth., Oct. 1925, v. 9, No. 10.

The investigator has set forth in three tables the comparative results of his experiments in determining the physicochemical condition of the vitreous. The hydrogen ion concentration was estimated by the Michaelis color indicator.

Table A; controls showed an average Ph. 7.47. Table B; secondary glaucoma, 7.53 and Table C; primary glaucoma, 7.57. It is interesting to note that the average is slightly higher in the primary than in the inflammatory glaucoma. The increase in alkalinity is not without influence on the volume of the vitreous, the swelling being due to an alteration of its acid

base equilibrium, not, however, in the direction of increased acidity as put forward by Fisher, but in the direction of increased alkalinity. One of the difficulties in accepting the interference with anterior chamber drainage theory is that as a fact the chamber is not deeper but shallower. D. F. H.

Hagen, Siguard. Glaucoma Pressure Curves. Acta Ophthalmologica, v. 2, Fasc. 3, pp. 199-212.

In a series of 78 glaucoma patients, 62 of whom had glaucoma simplex, 5 inflammatory glaucoma and 11 secondary glaucoma, the author recorded the morning and evening intraocular tensions in the form of curves. The tension of the normal eye varies only three or four points (as measured with the Schiötz tonometer) during the day, while the glaucomatous eye shows a much greater variation averaging about ten points. With glaucoma simplex the tension is usually higher in the morning, with secondary glaucoma in the evening. Frequently the pressure curve in the supposedly normal eye will follow the curve of the glaucomatous eye in its elevation and subsidence while remaining within normal limits. This is a sign that there is a tendency to glaucoma in this eye also.

If myotics will cause the pressure curve to return to a normal variation it is safe to employ them alone or to perform a simple iridectomy because this means that the iris is hindering the flow. If, however, the pressure curve does not become normal with myotics this means that the filter itself is blocked by causes other than a mechanical obstruction by the iris and some filtering operation will be necessary. L. T. P.

Wegner, William. Scotoma from Increase of Intraocular Tension. Zeit. für Augenh., 1925, 56, p. 48.

The author used an apparatus, that of Bliedung, with which a measured amount of pressure could be made upon the surface of the globe, thus causing an exact increase of intraocular tension. In 30 tests on normal eyes, when the pressure of 40-50 mm. Hg. was continued for as long as 30 minutes, there was noted no change in the field of vision, no scotoma, nor change in the blind spot.

Tests with increase of pressure of 30 to 40 mm. Hg. were made on five cases of glaucoma simplex, four of whom had had normal intraocular tension during the week preceding, and one in whom the tension was kept at the upper limits of the normal by the use of eserin and pilocarpin. In the first four cases no changes whatever were noted by increasing the intraocular pressure, but in the fifth case, after an increase of pressure around 30 mm., there appeared in a few minutes a definite enlargement of the blind spot nasally and upwards; by a further increase of 10 mm. of tension a greater enlargement of the blind spot upwards and downwards and inwards was observed. When the pressure was diminished, this enlargement of the blind spot disappeared. The enlargement was easily demonstrated with a test object of 1 sq. cm., while in the first four cases round test objects of 2 mm. were used. H. D. L.

Hoffman, W. Histology of Vernal Catarrh. Zeit. für Augenh., 1925, vol. 56, p. 21.

The author reported the history in brief and the microscopic findings in detail of three cases of vernal catarrh. All occurred in youth, 18, 8 and 17 years old respectively; in one case the signs and symptoms continued thru the winter. In all three the superior edge of the tarsus of the upper eyelid showed papillary excrescences, described as gelatinous and opaque in one case, as jagged, amyloid and whitish in another and milky white in the third case. In one case only the limbus showed thickening; eosinophiles occurred frequently in smears in but one of the three cases.

Microscopically, the epithelium was quite thin over the papillae altho thicker between them. Beneath the epithelium over the summits of the excrescences, there was present a broad seam of hyalin connective tissue in which small grains of fat could be demonstrated. Capillaries in the papillae were very numerous and dilated with cells; surrounding the

capillaries there showed cellular infiltrations with plasma cells, eosinophiles, round cells and mast cells. The same infiltration was found in the pretarsal tissue but in the tarsus there was generally present a small infiltration with plasma cells. H. D. L.

Barmettler. Radiotherapy in Ophthalmology. Arch. di. Ott., 1924, vol. 31, p. 463.

After a short history of radiotherapy in ophthalmology the author cites two cases of trachoma treated with radium by himself. Both cases showed marked trichiasis and one had been operated upon with the thermocautery. In the first case three applications were made, two with radium needles, the third with a plaque of radium. Two months after the second application most of the lashes had fallen out. Epilation was complete after the third treatment and the palpebral lesions of trachoma had disappeared entirely. A lead filter was used. In the second case one application of 6½ milligrams of radium bromid without filter was sufficient to obtain complete epilation after two months. He describes a special plaque made by him for the protection of the globe during the treatment. The loss of lashes is thought to be due to the effect of the radium in obliterating the small blood vessels supplying the hair follicles, its action being especially marked on endothelial cells. For such work both the beta and gamma rays should be used, necessitating very light filtration with careful protection of the globe.

S. R. G.

Dymling, Otto. Implantation of Cartilage After Enucleation. Acta Ophthalmologica, Vol. 2, Fasc. 3.

The author had used this procedure recommended by Magitot in 1921 in 66 cases. Spheres of sheep cartilage are treated with formalin and washed in distilled water for a long time and then implanted in Tenon's capsule. In 13.3% of the author's cases there was an early expulsion of the cartilage and in 6% a late expulsion. The cases were observed from 6 months to 2 or more years. In the 80% that were successful, the artificial eye showed good movement and did not appear sunken. L. T. P.

Angelucci. Trachoma in its Relation to Tuberculosis and Autoserotherapy. Arch. di Ott., 1925, v. 32, p. 1.

The author believes that persons of a certain constitution are especially susceptible to trachoma. This type is characterized by the signs ordinarily associated with lymphatism and the scrofulous diathesis in childhood. Definite signs of vagotonia are found in a large number of cases. It presents a marked contrast to the type in which tuberculosis is usually seen. The rarity of eye diseases in patients with pulmonary tuberculosis is noted. Statistics from the Naples Eye Clinic from 1920-23 showed that of all the children from eight to fourteen years old showing signs of scrofula, lymphatism and exudative diathesis, 73.5% had trachoma. Of the total number of adults showing signs of arthritis and neuritis, 33.7% had trachoma. Two hundred patients with trachoma were given careful physical examinations in the dispensary and fifty were admitted to the hospital for more careful examination. None showed any signs of active pulmonary tuberculosis. Several large hospitals for tuberculosis were visited to determine the frequency of eye infections and especially trachoma. Of 241 women examined only two cases of trachoma were found. Among 84 men there were five cases of trachoma, all very mild. Thus, in the author's experience, if patients with pulmonary tuberculosis were not immune to trachoma at least it assumed an unusually mild form in them where it occurred at all. This the author explains by the fact that subjects of pulmonary tuberculosis are usually of a hyperthyroid rather than a lymphatic type. The lymphatic type in which severe trachoma is present often develops tuberculosis of the bone and glands but seldom pulmonary tuberculosis. On the basis of this apparent opposition in types between patients with trachoma and those with pulmonary tuberculosis, the author

tried the effect of using the serum of trachomatous patients in patients suffering from various forms of tuberculosis. Cases of ocular, laryngeal, and pulmonary tuberculosis were so treated apparently with favorable results. Normal serum was tried on the same type of patients without any apparent result. Possible theories explaining its action are discussed. Cases of trachoma were treated by injection of their own serum, ½ c. c. being injected subcutaneously every three to four days. The results were especially favorable upon the corneal lesions and pannus which cleared very rapidly after the first few injections. S. R. G.

Padovani. Bismuth in Ocular Anti-Luetic Therapy. Arch. di. Ott., 1925. Vol. 32, p. 49.

The author reviews the literature concerning the use of bismuth as an antiluetic agent including the two reports which he was able to find of its use in ocular lues. (Those of Gourfein and Darier.) In seven cases treated by the author, sodium, potassium, bismuth tartrat were used, by intramuscular injections. The cases consisted of four of iridocyclitis, one complicated with third nerve paresis, one case of optic neuritis, one of scleritis and one of third nerve paresis alone, in all of which there could be no doubt of a luetic origin. In all cases satisfactory response to treatment was observed. In the case of optic neuritis vision was improved from 1-30 to 1 in one eye and to 1-10 in the other. One case which had proved resistant to mercury and one which had shown the same resistance to arsenic preparations were favorably affected by the change to bismuth therapy. Cases were not followed for a long enough period to obtain negative Wasserman reactions. No undesirable side effects of the treatment were observed except slight stomatitis. The method of administration is simple and practically painless. S. R. G.

Smaltino. A Rare Case of Retrobulbar Neuritis due to Latent Malaria. Arch. di. Ott., 1925, Vol. 32, p. 71.

A man of 32 had noticed a gradual decrease in vision until he could not tend to his work as a farmer. He had had a severe case of malaria five years before which was apparently cured after about one year. Vision was ½ each eye with fields contracted and a central scotoma in each eye. The fundus was normal except that the retinal arteries were very small, apparently the result of spasm. Examination for other possible causes of the neuritis were negative and all therapeutic measures were without effect until intensive quinin treatment was undertaken by injections and by mouth. Within two weeks vision had risen to ¼ in each eye and eight weeks later to ⅔ in each eye with almost normal visual fields. When seen three months later the improvement had been maintained. A review of the literature shows that the retina and optic nerve are the parts of the eye most frequently affected in malaria. Ophthalmologic signs pointing to involvement of the nervehead are often present. In the absence of such signs the history of a gradual diminution of vision, negative tests for syphilis and tuberculosis and the absence of a favorable response to antiluetic treatment, point to malaria as a possible cause, especially if there is a history of malarial infection. Favorable results of a course of treatment with quinin will help to confirm the diagnosis. The finding of parasites in the blood is not necessary for this diagnosis since they may be very difficult to find, especially in the aestivoautumal type of malaria. In cases of late malaria such as the present one, the organisms are present in the spleen and liver and are precipitated into the circulation by certain events such as chilling, fatigue, etc. In some cases possibly only the toxins are free in the blood stream and act by an elective affinity for the optic nerve. S. R. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. H. Alexander Brown, San Francisco; Dr. Wm Thornwall Davis, Washington; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. George F. Keiper, LaFayette, Indiana; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. George H. Kress, Los Angeles; Dr. Edward D. LeCompte Salt Lake City; Dr. W. H. Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Charles P. Small, Chicago; Dr. G. McD. VanPoole, Honolulu.

DEATHS

Dr. Philip Jager, New York, aged fifty-one, died November sixteen.

Professor J. N. Langley of Cambridge, England, is dead.

Dr. Percy Crofts Bardsley, Salisbury, England, died November twelfth, in his sixtieth year. For many years he was one of Mr. Marcus Gunn's chief clinical assistants at Moorfields.

Dr. Marcus Feingold, professor of ophthalmology, Tulane University, recently chairman of the section on ophthalmology, American Medical Association, died at the Touro infirmary, New Orleans, December 26, 1925, aged fifty-five years.

Dr. H. Kuhnt, emeritus professor of ophthalmology, Bonn, is dead. When he offered the operation of excision of the tarsus, Kuhnt said that he had said the last word on the treatment of trachoma. Subsequent experience has proven the accuracy of that statement.

Dr. S. Lewis Ziegler, for many years attending surgeon to Wills Eye Hospital, chief ophthalmic surgeon to St. Joseph's Hospital, member of the American Ophthalmological Society and of the Société d' Ophtalmologie Francaise, died of pneumonia at his home in Philadelphia, Jan. 4, 1926.

SOCIETIES

At the late meeting of the Indiana State Medical Association Drs. Albert E. Bulson, Jr., of Fort Wayne, and George F. Keiper, Lafayette, were reelected to the House of Delegates of the American Medical Association.

There will be a joint meeting of the Sioux Valley Eye and Ear Academy and the Omaha and Council Bluffs O. O. R. L. Society with the Kansas City Eye, Ear and Throat Society on February tenth at the Hotel Fontenelle, Omaha.

The Tenth annual Congress on Internal Medicine will be held at Detroit and Ann Arbor, week of February 22-27, 1926. One day will be spent at the University of Michigan with its new 1,100 bed hospital. All physicians interested in internal medicine and local and national societies are invited. C. G. Jennings, M.D., President, American Congress on Internal Medicine, Detroit, Mich. Frank Smithies, M.D., Sec'y. Gen'l., 920 N. Michigan Avenue, Chicago, Ill.

On Thursday, December seventeenth, the Section of Ophthalmology of the College of Physicians, Philadelphia, met at the College of Physicians Building, Philadelphia. The following program was given: Dr. Wm. F. Bonner (by invitation) "Monocular Color Blindness;" Dr. Wm. M. Sweet, "Pulsating Exophthalmos;" Exhibition of case. Dr. Wm. Campbell Posey, (1) "Tumor of the Orbit, Wrongly Diagnosed For a Time as Disease of the Sinuses;" (2) "Presentation of a set of Hays' knives used by Dr. Hays, also an Autograph; Note Concerning Them by Sir William Lawrence" Dr. Burton Chance, "Sir Wm. Lawrence—A Retrospect of Ophthalmological Education in the Early Nineteenth Century." Dr. J. Griscom, "Bifocal Trial Case Lenses."

The following officers were elected for the ensuing year by the Ophthalmological and Otolaryngological Section of the District of Columbia Medical Society: Chairman, Dr. William T. Davis; Vice-Chairman, Major Robert E. Parrish; Secretary, James N. Greear; Treasurer, Albert P. Tibbetts.

The Staff of the Episcopal Eye, Ear and Throat Hospital, Washington, D. C., has been reorganized with the following additions to the Senior Ophthalmological Staff: Dr. J. B. Griffith, Dr. J. W. Burke, Dr. Wm. T. Davis and Dr. Edward Morrison.

The Ophthalmological and Oto-Laryngological Section of the Cleveland Academy of Medicine held its November meeting Friday, the 27th, 1925. Officers were elected as follows: Chairman, Dr. W. C. Tuckerman, Secretary Dr. M. Paul Motto. A case of "Siderosis Bulbi" was presented by Dr. Motto. Dr. J. W. Jacoby spoke on "The Use of Red Free Light in Ophthalmoscopy. Normal and pathologic fundi cases were explained and demonstrated by the Jacoby lamp. "Some Observations and Suggestions on Refraction" was taken up by Dr. W. E. Shackelton, followed by Dr. H. J. Hartzell who discussed "The Routine Dispensary Refraction."

At the regular meeting of the Kansas City Eye, Ear, Nose and Throat Society held in January, Dr. W. B. Lancaster of Boston addressed the society on the subjects of "Ptosis", "Exophoria, "Squint", "Glaucoma" and "Cataract"; and Dr. G. L. Tobey lectured on "Chronic Otitis Media" demonstrating a new method of attack for mastoidectomy.

PERSONALS

Dr. Edward K. Ellis has been appointed assistant professor of ophthalmology to the Tufts Medical School, Boston.

Dr. Alfred Desloges, formerly intern at the Hotel Dieu Hospital, Montreal, has been appointed a fellow in ophthalmology at the Mayo Clinic.

Dr. David L. Tilderquist has been elected president of the Minnesota Academy of Ophthalmology and Otolaryngology and Dr. John H. Morse, secretary-treasurer.

Mrs. John Dibert has given the Eye, Ear, Nose and Throat Hospital, New Orleans, another gift of $50,000, making her total donation to that institution $135,000.

Prof. L. Koeppe of the University of Halle, addressed the Chicago Ophthalmological Society, December twenty-second, on "The Importance of Einstein's Theory of Relativity and Gravitation for the Physiologic Color Perception of the Living Eye."

Dr. Wm. L. Shoemaker of Philadelphia, Dean of the Graduate School of the University of Pennsylvania, gave a dinner at the Union League following one of the Sessions of the American College of Surgeons, to those who participated in the program of the Eye Section of the College.

Dr. Henry O. Reik, former president of the American Institute of Medicine and editor of the International Medical and Surgical Survey, has been appointed editor of the Journal of the Medical Society of New Jersey, succeeding the late Dr. David C. English.

Doctor Mérida Nicolich, Ex-Director of the Ophthalmic Hospital of St. Thomas, Málaga, Spain, who was blinded a year and a half ago by a shot, has been appointed Director of an Institute for the Blind, Deaf and Dumb and Abnormal Children which is now being opened in Málaga.

MISCELLANEOUS

The Brooklyn Home for the Blind was left $1,500 by the will of the late James Burns.

The New York Association for the Blind received a bequest of $25,000 from the late William Carr, and $500 each from Morris J. Hirsh and Moses Ottinger.

The Pennsylvania Institution for Instruction of the Blind was left $2,000 and the Chapin Home for the Aged Blind, Philadelphia, $1,000, by the will of Miss Louisa T. Pfaff.

The Harlem Eye and Ear Hospital received $3,000, and the Misericordia Hospital and the Society for Relief of the Destitute Blind each $1,000 under the will of the late Mary C. VanCott.

The Eastern Association of Indian Affairs held a joint meeting with the National Committee for the Prevention of Blindness at the Russell Sage Foundation building, New York, December second, to consider the campaign against trachoma among the Indians.

It is rumored that the reason why the Nobel prizes were suspended this year is because of very high government taxes. In 1901 the taxes on prizes were 88,000 crowns. In 1923 they were 578,000 crowns, while the prizes decreased from 709,000 to 574,000 crowns. The Nobel family has petitioned the Stockholm government to exempt the Foundation from taxes.

Dr. George E. deSchweinitz of Philadelphia presented a valuable contribution upon the life and work of Dr. Joseph Leidy before the section of Medical History of the College of Physicians of Philadelphia, on Tueday evening, December fifteenth. Added interest was given the occasion by reason of the presentation of the following eminent members of the profession in Philadelphia, of papers upon the work of a galaxy of physicians and surgeons whose achievements in the world of medicine have added especial luster to the notable history of Philadelphia medicine: Samuel D. Gross, M.D., by J. H. Gibbon, M.D.; D. Hayes Agnew, M.D., by John B. Deaver, M.D.; J. M. DaCosta, M.D., by H. R. M. Landis, M. D.; William Pepper, M.D., by Alfred Stengel, M.D.; S. Weir Mitchell, M.D., by C. W. Burr, M.D.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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